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Lud. Vives.

NAture *is not to be examined by the Lamp of the Gentiles, yielding both an obſcure and maligne light: but by the Torch of the Sunne, which Chriſt hath brought into the darkneſſe of the World. And for that very cauſe we have had occaſion to write, leſt we ſhould be neceſſitated to follow the traditions of the Gentiles; between whom and us there is ſo vaſt a difference in Religion. And to ſay truth, as* Ariſtotl's *writings have much learning and ingenuity, ſo they have very much obſcurity: which hath given occaſion to ſome to enquire after, and ſuppoſe they ſee theſe things which are no where in being, &c.*

We therefore in thy light, ô God, ſhall ſee light. *Pſal.*36. *v.*10.

NATURALL PHILOSOPHIE REFORMED BY *DIVINE LIGHT:* OR, A SYNOPSIS of Physicks:

BY

J. A. COMENIUS:

Exposed

To the censure of those that are lovers of LEARNING, and desire to be taught of GOD.

Being a view of the *WORLD* in generall, and of the particular *Creatures* therein conteined; grounded upon *Scripture Principles.*

With a briefe APPENDIX touching the *Diseases* of the *Body, Mind,* and *Soul*; with their generall *Remedies.*

By the same AUTHOR.

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To the truly ſtudious of wiſdome, from Chriſt the fountain of wiſdome, greeting.

IAcobus Acontius, a moſt excellent man, offended at the evill diſpoſition of our ſcribling age wiſhed that it might be provided, *that none ſhould write and publiſh any thing, unteſs it were ſome new thing; which ſhould both be of his own obſervation, and might make for the glory of God, and the ædification of the Church, and from whence ſo much fruit might be hoped, that what time is beſtowed on the reading of it, the readers could not beſtow it better elſwhere: that ſo nothing might be done which was already done, but what was yet to be done. For few Writers (ſays hee) bring any*

thing of their own: but onely ſteal, things and words, of which they make Books, &c. Which they know to be moſt truly ſpoken, who are to peruſe that *farrago* of Books, wherewith we are yearly little leſs then overwhelmed. For if you look on the titles, you ſhall have them always new and very ſpecious: if on the thing, it is always the ſame boiled over and over above a thouſand times, and Coleworts crammed in, even to nauſeating. And though ſomething of new obſervation be offered, yet to what purpoſe is it, that whole Books ſhould therefore be written, and thoſe new things found out ſo buried in things ordinary, that either a man hath no mind to enquire, what of new obſervation is in them, or cannot do it without tediouſneſs of ſpirit and loſs of time. But it is not my buſineſs to inveigh againſt this diſorder in many words. I come now to declare why I my ſelf come out in publick. And I wil

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lay it open in a word *I bring something new, and different from the common way of Philosophie: And I bring it so, as that I hope, it will be without any ones hinderance or molestation, as conteining in a very few leaves, matters of very great moment. And I bring it to satisfie the desires of others this way.* For whereas I had the year last past, given a proof of my Philologicall endeavours, *Janua Linguarum reserata*, (or a seminary of Arts and Languages) which was courteously received, and that with applause, and approved almost by all mens verdict, (as severall letters, dated either to my self or my friends, touching that matter do testifie,) some (of the number of those, who at this time bend their desires, thoughts and dedevours, to rectifie the method of studies) began to solicit mee, to put out my philosophicall Works, or at least to desire a communication of my conceptions, especially in Physicks. Having

ving no other minde therefore, but to bring something for mine owne part that may be profitable, if it may be: or else that others may have occasion by me, to bring better matters; I purposed with my self to expose to the light, this same *Synopsis of Physicks*, lately dictated in this Schoole, that publick censure might be made of this also, as well as of my former Work. Which that it might be, it seemed meet to give some further intimation of the occasion and scope of our undertaking, to those that will offer themselves to be our censors.

After that the calamitous lot of exile had thrust mee, who was by calling a Divine, back to the services of the School, wherein I was desirous to beare my self, not slightly, but so as that I might discharg the trust committed to me; it chanced that I hapned, among other things, upon *Ludovicus Vives* his Books, *de tradendis disciplinis*. In

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these when I had found most wholesome counsels, for the repairing of Philosophie, and the whole course of studies, I began extreamly to grieve, that a man of so piercing a wit, after he noted so many most evident errours, had not put to his hand to make those rough things smooth, but the judgment of one touching this excellent Writer, *that Vives saw better what was not then what was*, made mee to consider, that it is usuall with the wisdome of God to communicate things by degrees. Yet I thought with my self that others should take this as an occasion to labour to designe one certain and infallible way among so many deviacions discovered unto them: which I wondred that men were so backward to essay for full a hundred years. (For I knew not whether any one had gone about it.) But it hapned, that a certain learned man, to whom I communicated these complaints of mine in a more

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familiar manner, shew'd mee a Book call'd, *Prodromus philosophiæ instauranda* by *Thomas Campanella* an *Italian:* which I read over with incredible joy, and being inflamed with an exceeding great hope of new Light, I greedily turn'd through his *Realis philosophia epilogistica* (for so hee calls it) set forth in foure Books, as also the Books *de rerum sensu*, where ever I could get them. Whereby I found my desires in some sort satisfied, but not throughout. For his very foundation, that all things were made up of two contrary principles only, offended me. (For I was already most fully perswaded of the number of three principles out of the divine Book of *Genesis:* and and I remember out of *Hugo Grotius*, disputing against the *Manichees*, *That of two things fighting one with the other, destruction might follow, but an ordinate construction could never follow.*) And besides I observed that *Campanella*

nella himself was not very certaine of his own hypotheses: as one that began to waver in his assertions towards the positions of *Galilæus* touching the earths mobility, and yet to call them in doubt himself: as it is evident enough in his Apologie for *Galilæus*.

But when I chanced afterwards upon a piece of Sir *Francis Bacon Baron of Verulam, Chancellour of England*, entituled *instauratio magna* (an admirable work, and which I look upon no otherwise, then as a most bright beam of a new age of Philosophers now arising) I understood that in some particulars also of *Campanella*, such solid Demonstrations, as the truth of things requires, were wanting. Yet it grieved me again, that I saw most noble *Verulam* present us indeed with a true key of Nature, but not open the secrets of Nature, onely shewing us by a few examples, how they were to be opened; and leave the rest to depend on ob-

obſervations and inductions continued for ſeverall ages. Yet I ſaw nevertheleſs, that my hopes were not quite left in ſuſpenſe: in as much as I perceived my minde ſo enlightned by the light which it received from thoſe ſeverall ſparks, now grown welnigh to a torch, that ſome great ſecrets of Nature, and very obſcure places of Scripture, (the reaſon of which I knew not before) were now plain, as it were of their own accord, to the exceeding great content of my mind. For now with thoſe, that have lighted upon a more ſound way of Philoſophie in this age, I ſaw and reſted in it;

I *That the onely true, genuine and plain way of Philoſophie is to fetch all things from ſenſe, reaſon and Scripture.*

II *That the Peripatetick philoſophie is not onely defective in many parts, and many ways intricate, full of turnings and windings, and partly alſo erroneous, ſo that it is not onely unprofitable for Chriſtians,*

stians, but also (without correction and perfection hurtfull.

III *That philosophie may be reformed and perfected, by an harmonicall reduction of all things that are and are made, to sense reason and Scripture, with so much evidence and certainty (in all such things as are of most concernment, and have any necessity) that any mortall man seeing may see, and feeling may feel, the truth scattered every where.*

Of all and every of which observations, least we should seem to have dreamed somewhat, there will be some thing to be said more at large.

And for the first we make three principles of Philosophy, with *Campanella*, and his happy Interpreter *Tobie Adams*, *Sense*, *Reason and Scripture:* But so joyntly, that whosoever would not be left in ignorãce or doubt, should rest on no one of these without the others, otherwise it will be a most ready precipice into errors. For *Sense*, though

it make an immediate impreſſion upon us of the truth imprinted upon things: yet becauſe it is very often confounded, either by reaſon of the multitude of things in a manner infinite, and the ſtrange complications of formes: or wearied and tired, ſometimes with the diſtance of the objects, and ſo conſequently dazeled and deceived. *Reaſon* muſt of neceſſity be imployed, which may conclude alike of like things, and contrarily of contrary things, by obſerving their proportion, and ſo ſupply the defect of ſenſe, and correct its errours.

But then becauſe many things are remote both from ſenſe and reaſon (which we cannot in any ſort attein unto by ſenſe, nor yet by reaſon firmly enough) we are indepted to the grace of God, that he hath *by his Word* revealed unto us even ſome ſecrets which concern us to know. Therefore if any one deſire the true knowledg of things, theſe

these three *principles of knowing* must of force be conjoyned. Otherwise, he that will follow the guidance of sense onely, will never be wiser then the common sort; nor be able to imagine the Moon lesse then a starre; the Sun greater then the earth; and that a plain sphæricall, and every way habitable. On the contrary if a man contemplate on abstract things and consult onely with reason without the testimony of sense, he will be rapt away with meer phantasmes, and create himself a new world: like the Platonicall and Aristotelicall, &c. Lastly, they that heed the Scripture onely, and hearken neither to sense nor reason are either carried away beyond the world (by the sublimity of their conceptions;) or else involve things they understand not with the Colliers faith; or following the letter, propound unto themselves things, though never so absurd and superstitious, to be believed; as

Papists do in that most absurd transubstantion of theirs, &c. So then *the principles of knowing*, must be conjoyned, that divine *Revelation* may afford us belief; *Reason*, Understanding, *Sense*, Certainty. And they must be used in this order (in naturall things I say) as that we begin with sense, and end in revelation (as it were the setting to the seal of God:) for by this order every subsequent degree will receive receive from the antecedent, both *Evidence* and also *Certainty*, and *Emendation*. For as there is nothing in the understanding which was not first in the sense: so there is nothing in the belief, which not first in the understanding. For he that believes, must know what is fit to be believed. Hence the Scripture frequently invites us to hear, see, taste, consider; And affirmes that faith too comes by hearing. I said *Certainty* too. For by how much the neerer Reason is to sense (that is by how many

many the more experiments of the ſenſes it may be demonſtrated) it is ſo much the more reall: and on the contrary again, the further it recedes from ſenſe, by ſo much the more vain ſpeculation and naked imagination it hath. But by how much the neerer divine Revelation may be reduced to underſtanding, and the teſtimonies of experience, ſo much the more ſtrength it findes.

I ſaid further, that the precedent degrees were corrected by the ſubſequent: and ſo it is. For where ſenſe fails or miſtakes, it is ſupplied and corrected by reaſon: And Reaſon by Revelation. For example, when the ſenſe judgeth the Moon to be bigger then *Saturn*, or an Oare to be broken under the water, &c. Reaſon rectifies it by certain documents of experience. So when Reaſon hath gathered any thing falſely of things inviſible, it is amended by divine Revelation. Yet that emen-

dation is not violent, and with the destruction of the precedent principle: but gentle, so that that very thing which is corrected, acknowledgeth, and admits it of its own accord, and with joy, and soon brings something of its own, whereby the same corrected truth may become more apparent. For example, Reason brings nothing to correct sense, whereof it is not soon ascertained by sundry experiments, and affirmes it self, that so it is, (as that an Oare is not broken under water, the Touch teacheth: so also the sight it self, looking on it after it is drawn out.) Faith holds out nothing, which is contrary and repugnant to Reason, (though it bring that which is beyond and above Reason:) But all things such as Reason not onely yields being overcome by authority, but also finds of a truth to be in things, and so seeks and finds out some thing of its own, which may serve to con-

confirme and illustrate the same truth. *Therefore let it be taken for true, That Sense is not onely the fountain of knowledge, but also of certainty, in naturall things: But that the understanding is the Organ not onely of knowledge, but also of certainty in revealed things.*

Let us come then to the purpose. *Some deny, that holy Scripture is to be drawn to Philosophie, because it teacheth not the speculation of outward things, but the way of eternall life, I confess, that the Scripture was given by inspiration of God, to teach, reprove, correct, and instruct in righteousnes: That the man of God may be perfect, throughly furnished unto all good works.* (2 *Tim.* 3.) I confess, I say, that this is the ultimate end of the Scripture. Yet who knows not, that there are for the most part more ends of one thing? even in humane things, much more in divine, where the wisdom of our adored God hath wholly wound up it self, with an artifice

ſcarce to be found out of us. Truly, if wee finde that artifice all over nature, (and ſo it is) that every creature, and part of a creature, and part of a part, ſerves for ſeverall uſes: I ſee no reaſon why we ſhould deprive the Book of God of this character of the higheſt Wiſdome. But I ſee reaſon why we ought to determine, that moſt ſufficient complements of all things, whereunto Senſe and Reaſon were inſufficient (and yet wee were concerned to know them) are extant in that moſt holy Book. For did not God bring man into the School of the World, to contemplate his manifold Wiſdome? Did not hee command him to behold his inviſible things by theſe things that are ſeen? (*Rom.* 1. *v.* 20.) Surely this muſt be acknowledged to be the end both of making the World and placeing man therein. Now it is cleere through all Nature, that, to whatſoever end God hath ordained any thing,

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he hath conferred means upon it to be ſtein it. Hee hath therefore conferred means upon man to contemplate his wondrous things: Which as wee muſt acknowledge that they are ſenſe and reaſon, ſo we muſt needs acknowledge that they are not every where ſufficient. For our ſenſes leave us in the knowledge of eternall things, and thoſe things which are placed quite out of ſight, and done when we are not preſent. But where Senſe fails, Reaſon fails alſo: Being that this is nothing but an univerſall knowledge of things, gathered from particulars acts of ſenſe, that this or that is, or is done, either ſo or ſo. When as therefore both Senſe and Reaſon doe very ordinarily fail us, ſhall we believe, that the moſt gracious Father of Lights, would not ſupply this defect ſome other way? His moſt liberall and in every reſpect approved bounty towards us, will not permit us to ſuſpect that. But if God

have some way or other provided for us, let it be shewen what it is, or where it is to be sought for, if not in that sacred volume of Oracles? And I pray, was it in vain, or onely in respect of our eternall salvation, that God gave us his Law. *This is your wisdome and understanding in the sight of the Nations, which shall heare all these statutes and say. Surely this is a wise and understanding people. (Deut.4.6.) Or did David boast in vain? I have more understanding then all my teachers, because thy testimonies are my meditations (Psal.119. 99.)* Or the sonne of *Sirach* say in vain: *The Word of God most High is the fountain of wisdom? (Eccles.1.5.* Or was it in vain that *Salomon* call'd God, *the guide unto wisdome, and the corrector of the wise? Wisd.7.15.)* see here a correctour! But how doth he correct, but by dashing over our vain cogitation with his word? And to what purpose, I pray is all that is frequently mẽtion'd

tion'd concerning the beginning of the World and the order of the Creation, and properties of the creatures, If the parent of nature, who is also the Dictatour of the Scriptures, meant to teach us nothing of nature? *They say it is to this end, that we may learn to know and admire, love and fear the Maker of all things.* Right: But how the Maker without his work? Does not any one so much the more admire and praise the ingenuity of the Painter, if he be excellent, by how much the better he understands the art of painting? Surely yes. A superficiall knowledge will never raise either love or admiration. And then I demand, those things, which wee meet with in the Scriptures concerning the creatures (by similitudes also drawn thence) are they true or false? If true (for who can determine otherwise without blasphemie) why may we not conferre them with those things that are ma-

manifeſt by ſenſe & reaſon: that ſo we may finde out that harmony of truth, which is in things, and in the mouth of the Author of things: *Truly, if the words of the wiſe are as goades and nails faſtened:* (as *Salomon* teſtifies, *Eccleſ.* 12.11.) What ſhall we think of the words of the all-wiſe God? But this, that though they raiſe us up with another end, and by the by, yet they contein nothing but moſt ſolid truth and all manner of wiſedome. In vain therefore may ſome one ſay: *I finde no mention in the Scriptures, much leſs precepts of Grammar, Logicke, Mathematicks, Phyſicks,* &c. For there is as much diſtance betwixt divine writings and humane, as betwixt God himſelf and man. Man that is limited with time, place and objects, at one time and in one place can do but one thing: but God that is æternall, omnipreſent, and omniſcient, at once ſees, rules and goverſns all things, always and every where.

where. And the same Character do their writings retein on either part. Humane writings do some one thing with expresse endeavour, handling one object in one place, and that in such a way as is most pleasing to mans understanding: but divine writings like an universal treasury of wisdome stay not upon one particular matter, (unlesse it be in things pertaining to Theologie) but contein variety of matter under severall sayings. Whence a Divine, a Moralist, a Politician, a Housholder, a Philosopher, a Philologer, &c. may take out every of them, what each hath use of. And this breadth & depth of the Scripture is its prerogative before humane writings, that so it may be in truth an inexhaustible fountain of all wisdome. For whatsoever matter is to be handled, the Scripture affords always, either a rule, or some sayings or examples: as *John Henrie Alsted* (sometimes my honoured

red Master) shews in his *Triumphus Biblicus*, and much more might be discovered by a very accurate diligence: which that so it is, for a good part of it, shall appear also in these our Physicall meditations. Rightly therefore said *Cassiodorus: the Scripture is an heavenly school, wherein we learn whatsoever we are either to learn or to be ignorant of.* And piously *T. Lydiat: It is most absurd, that heathen Philosophers should seek for the principles of all arts in* the Homers *posie, and that* we *Christians should not do the same in the Oracles of God, which are a most plentifull and most clear fountain of wisdome.* (About the end of his Physiological disquisition.) Those most Christian Philosophers are therefore deservedly to be praised, who have endeavoured to render unto God the Parent of things that praise that is due unto him, *Franc. Valesius*, *Lambert Danæus*, *Levinus Lemnius*, *Thomas Lydiat*, *Conradus Aslacus*, *Otto Casmannus*;

nus; who have not doubted to asseverate, that the seeds of true Philosophy are conteined in the holy Book of the Bible, and to derive their maximes of Philosophy from thence (though with different successe.)

Let it stand therefore, that Philosophy is lame without divine Revelation. Whence wee have this consequence, *that Aristotle is not to be tolerated in Christian schools, as the onely Master of Philosophie: But that we should be free Philosophers, to follow that which our senses, Reason, and Scripture dictate.* For what? Are not we placed as wel as they in Natures garden? Why then do we not cast about our eyes, nosthrils and ears as well as they? Why should we learn the works of nature of any other Master, rather then of these? Why do we not, I say, turn over the living book of the world instead of dead papers? wherein we may contemplate more things, and with greater delight and

and profit then any one can tell us. If we have any where need of an Interpretour the maker of nature, as we have ſaid, is the beſt Interpretour of himſelf. If a Monitour or Suggeſtour, we have more and better then *Ariſtotle*, experience (of the various and occult Mæanders of nature) being multiplyed in the proceſſe of ſo many ages. For as all humane things get up to perfection from rude beginnings, ſo Philoſophy hath had its grouths too. In *Ariſtotles* age it was ſcarce out of its infancy: In the ages that followed after, (eſpecially in ours) it was ſo increaſed ſtil with new obſervations, that the Ariſtotelick tenets ſavour of obſcurity & uncertainty in cõpariſon of theſe, nay, they hold out open falſities. *Be it then* (writes *Rod. Goclenius* to *Nic. Taurellus*) *that nature hath ſhewed all the acuteneſſe of humane ingenuity in* Ariſtotle; *let* Ariſtotle *be a man that hath deſerved well of all humane wiſdome beyond and above all other mortall men beſides;*

sides; let him be the Father and Captain of our wisdome; let him be the supream Dictatour of wisdome, the Generalissimo of Philosophers, the eagle of the Philosophicall Kingdome, wisdome and praise of literature; let him be the Hercules, the Prince, the Tribunall of truth; let him be the deity of Philosophers; let him be lastly a man greater then all praise, and above all calumny; which titles *Julius Scaliger* sets him out with: *yet this miracle of Nature is not the RULE OF TRUTH, seeing that hee hath not every where traced Truths footsteps.* Thus *Goclenius.* Now hee that will may see *Campanella* and *Verulamius*, (for it may suffice, to have shewed these Hercules, who have happily put to their hands to the subduing of Monsters, and cleansing *Augias* stables; and to have opposed them to those, whom the authority of *Aristotles* vainly swelling Philosophy holds bewitched:) and feel how farre *Aristotles* assertions are often

often from the truth, and this is the cause why it seems convenient, that *Aristotle* with all his heathenish train should be excluded from the sacred Philosophy of Christians; least they should any more entangle the truth in errours, and involve and obscure those things with intricate disputations, which are of themselves plain by the lamp of the Word of God, and of sound reason. For is it not very absurd, that Christians, who are trained up in the true knowledge of the true God, and taught by his holy voice, concerning the originall causes, end, and manner of subsistence of all things visible and invisible; to whom also the very mysteries of æternity are revealed; whom the anointing of God teacheth all things; to whom Christ hath imparted his mind (*1 John 2. v. 27. 1 Cor. 2. 16.*) that they, I say, should seek for the truth of things amongst the heathen, that are destitute of all these, and

and have no other helps, but those of reason, and of the senses, which are common to us with them? Is it so indeed that there is not a God in *Israel*, that we go to enquire of the gods of *Ekron*? Is the light of *Hierusalem* so put out, that we must needs borrow lamps at *Athens*? It is well known that *Origen* was the man that first of all joyned heathen Philosophy with Christian Religion: with no ill intent perhaps, but sure it is with very bad event. The good mans purpose without doubt was to put some externall splendour upon Christian Religion, as then contemned by reason of its simplicity, that so Christians might be well appointed to buckle with the Gentile Philosophers at their own weapons. *But whither or no came this perswasion from him, that hath called us out of darknesse into his marvellous light, and commanded us to beware of vain Philosophy after the tradition of men, after the*

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rudiments of the World, and not after Christ. (*Gal.5.8.1 Pet.2.9.Colos.2.8.*) And indeed the most sad estate of the Church a little after shews what fruit we had in coupling *Aristotle* what Christ; when all was ful of the noise of disputations, (for slippery quæstions, and an itching desire of controversie is the very soul of Peripateticisme) and hæresie sprung out of hæresie, till at length the fumes of humane opinions had so quite darkned the brightnesse of the divine wisdom, that all things degenerated into Antichristianisme. Where in forging articles of faith, and ordaining rules of life, *Aristotle* had an æquall share with Christ, that I may not say he had the sole dictatourship: of which thing our School divinity will give us a very cleer sight. If *Origen* then a man of so sublime a wit, in vain attempted to piece out Christian religion with that same heathen Philoso-

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phy; and *Thomas Scotus* nor no man else had any better successe, why then do we tolerate it? Why do we not slip our wits out of those snares? why do we not throw away those spectacles which present us with fancies instead of things?

Some are afraid, least, if they should let go Peripatetick Philosophy, they should have none at all. As if when *Hagar* were cast out, there would have been none to bless *Abraham* with issue! Or that the *Israelites* would have been sterved with hunger, when they had left the Ægyptian flesh pots; or that *Moses* must needs have grown blockish, when he was out of the company of the wise men of *Memphis*! Nay rather, that promised Grace will come at length, at length that heavenly *Manna* will rain down, at length we shall be truly θεοδίδακτοι taught of God, when turning away our ears from humane opinions, we shall hearken to God alone

ſpeaking by Nature, and by his Word. And then how ſolid, eaſie, and delightfull will all things be! when as the whole courſe of Philoſophy will not conſiſt in opinions but in truth.

But greater care was to be had of method: that all things ſhould be delivered to the learners in ſuch a way, that they may finde knowledg to flow into them, not to be ſtuft in; always beginning with thoſe things that are beſt known, and ending in things no leſſe known then they. For why ſhould we think that impoſſible in Phyſicks, which is ſo excellently atchieved in *Mathematicks?* where all Demonſtrations (*N.W.*) are brought to the very ſight: and all is ſo contrived together of things that go before and are better known (always beginning with ſuch common things that it is tædious to the unskilfull to heare them) in ſuch an order, as that which is in the middeſt is never ſkipt over, nor place given to that which is more unknown, whence

whence it comes to passe, that you must of necessity assent as well to that which is last, as to that which is first. And truly there is reason to wonder why the like hath not been yet assayed in Metaphysicks, Physicks, and Theologie, (for Ethicks and Politicks concern more contingent things.) I am not ignorant that there is more evidence in Numbers, Measures and Weights, then in Qualities, by which Nature puts forth its strength after a hidden manner: yet I will not say that there is greater certainty in them, seeing that all things are done alike not without highest reason, in a continued order, and as it were by an æternall law. And yet in Mathematicks all things are not alike plain, yet they are assayed sundry wayes till they can be reduced to ἀυτοψία, or very sight, as I said before, and delivered scientifically. *For he sayes nothing in Philosophicall matters that proves nothing: and he proves nothing that doth*

not so demonstrate it, that you cannot contradict it. And now I beseech you let this be our businesse, that the schools may cease to *perswade*, and begin to *demonstrate*: cease to *dispute* and begin to *speculate*: cease lastly, *to believe*, and begin to know. For that *Aristotellicall* maxim; *Discentem oportet credere*, A learner must believe is as tyrannicall as dangerous; and that same *Pythagorean* αὐτὸς ἔφα *ipse dixit*. Let no man be compell'd to swear to his Masters words, but let the things themselves constrain the intellect: Nor let a Master have any more credit given him, then hee can demonstrate in very deed, that hee is to have. For in a free Common-wealth there ought to be no *Kings*, but *Dukes or Generalls*; no *Dictators*, but *Consuls*. And those that profess the art of instructing men, are the Fathers of men, not the carvers of Statues. O when shall we see that day! that all things which ought to be known shall offer themselves so to

a mans understanding, that there wil be nothing but what may be understood for the very cleerness of it, nothing call'd in doubt for certainty: the truth of things making such an impression upon the senses with its light. For hee doth not see truly, who must yet be perswaded by arguments to make him believe that hee sees: as wee have been hitherto dealt with for the best part.

I could not choose, because I seemed to see light in the light of God, but assay calling God to my aid, to reduce these new hypotheses of naturall things into a new method, and dictate them to the schollers of this school. And thence sprang this, which I now offer, representing a draught of the lineaments of some new, (and as I hope truly Christian) Philosophie. Not that I would crosse the design of great *Verulam* (who thought it the best way to abstein from Axiomes and method, till full inductions could be made, of all and every

thing throughout all nature:) but to make an experiment in the mean time, whether more light might be let into our minds by this means to observe the secrets of nature the more easily, that so *praise might be perfected to God out of the very mouth of infants, and confusion prepared for the gainsaying enemie*; as *David* having comprised the summe of Physicks in a short hymne for the use of the unlearned) speaks. *(Psal. 8.)* I have entituled it a *Synopsis of Physicks reformed by divine light*: becaus Philosophy is here guided by the lamp of divine Scripture, and all our assertions are brought to the attestation of the senses and reason, with as much evidence as could be possible. Now both those come under the name of divine light. For as *David* said, *THY WORD is A LANTHORNE unto my feet*: so said *Salomon THE SPIRIT or mind OF A MAN is THE CANDLE of the Lord searching all things.* *(Psalm*

(*Psalm 119.105. and Proverbs 20.27.*

If any one object: That these things here delivered, are not yet of that certainty or evidence, as to be preferred before *Aristotles* so long received doctrine; *I will answer*, that is not my drift at present: but onely I propound this as an example, that a truer way of Philosophie may be set out, *by the Guidance of God, the Light of Reason, and the Testimonie of Sense*, if Philosophers would labour more after God and the Truth, then after *Aristotle* and Opinions. In the mean time, these should be the more acceptable, and had in more reverent esteem of us, if it were for nothing but this, that they are taken from the Oracles of God, and aime at a more abundant knowledg of God. For my part truly I had rather (in that mind I now am: and that it may so continue, strengthen me, ô God) I had rather I say erre, having God for my guide, then having *Aristotle:* that is, I had rather

rather follow the voice of God, though not throughly understood yet, so I follow it, then be carried away from the sacred testimonies of my God, to the devices of the brain of man.

I confesse my self, that something more were to be desired here yet, to that rule of certainty and evidence which I spake of before: yet because I trust that these things may be brought to a fuller ἀκρίβειαν [exactnesse] by reiterated meditations, (of mine own or some others,) I doubted not to follow the counsell of great *Acontius*: *If thou hast made any rare observation*, sayes he, *which never any one before made (whither the thing be a new invention, or some new way of former inventions) although much be wanting as yet, which is above thy strength, nevertheless if thou shouldest not make it publick, it would argue either too much cowardize, or too much haughtinesse of thy mind, and however that thou art no lover of the Common Wealth.* And

why

why ſhould not theſe things be accounted as new inventions; *That ternarie of principles ſo clearly demonſtrated from Scripture, Reaſon, and Senſe? Why not that admirable ſcale of ſubſtances, by a ſeptenarie gradation? Why not the doctrine of ſpirits (as well ſeparate as incorporate:) of motions alſo and qualities, laid down more accurately and plainly then ever before, & letting in a quite new light into the knowledg of naturall things?* To ſay nothing of ſmaller matters ſcattered all over the book. Every of which in particular though I dare not defend tooth and nail, for ſome things perhaps are ſtill the reliques of common tradition: and others it may be, not yet ſufficiently eſtabliſhed upon the foundations wch we have laid down) yet I am perſwaded that they are the groundworks of unmoved truth, and avail much to the more exact obſervation of particular things. And that I may ſpeak in a word, I hope there

is

is so much light in this method of Physicks here delivered, that very little place is left to doubts and disputations: so that it makes something towards the taking away the controversies of Authours, the opinions of all (whatsoever of truth either *Aristotle* hath; or *Galen*, the *Chymicks*, *Campanella* and *Verulamius* do reasonably alledge against him) being reduced to an harmony; which may be made plain by the example of the principles of which they make bodies to consist, (which *Aristotle* would have to be *the four Elements*; the *Syagyricks Salt, Sulfur and* ☿. Nay more, that by this means a gate is opened in a new kinde of way, not onely to the understanding of Arts and humane inventions, but also to multiply them: which could never be, unless the foundations of truth were found. Perhaps I speak more, then the Reader will think he finds in my Writings. But if he saw but the streams (the delineation of

that *Panſophia Chriſtiana*, which wee have in hand) that are derived from this fountain, as alſo from that of our Didacticks and Metaphyſicks, hee would not hold it vainly ſpoken. But becauſe thoſe are not yet brought to light, I ſet down this as a law for theſe that are: *If any thing be not ſufficiently deduced from Senſe, Reaſon, and Scripture; If any thing cohere not harmoniouſly enough with the reſt; If any thing be not evident enough with its own perſpicuity, let it be taken as not ſaid at all.* Which law ſtanding in force it may be lawful for my ſelf & all others, both to doubt always, and every where whether every thing be ſo as it is delivered to be: and alſo to enquire why it is, as it is found to be; by which two courſes, that the loweſt foundations of truth, will in time be diſcovered no body needs to doubt.

Therefore let none of vs ſeeke after any thing elſe, but how the truth may

may best be maintained on all hands which if it happen not to be on our side, and that we are deceived with appearances of truth, (as it is very usuall in humane affaires,) I beseech all those that are more sharp-sighted, for the love of truth courteously to shew us our way, which we have lost, and where our demonstrations come not together. But if these savour of truth something neer, that then they would not disdain to joyn their endevours with ours for the illustration thereof: that all of us being the children of truth may compose and sing Hymnes of prayse together to God the Father of Truth. Thou therefore

O Christ the Fathers glory bright,
Of this great World the onely light;
On us some beams of light bestow,
That are thy servants, thee to know.

Amen, Lord make me to see! here indeed

deed thy externall light shining upon, and internall informing thy creatures, but there in [in heaven] æternall and uncreated! *Amen, Amen.* And so Christian Readers farewel.

F. A. C.

March the 12th. 1650.

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PRO-

PROLEGOMENA.

Touching the nature, foundation and use of Physick.

I *Physick is the Scientiall Knowledge of naturall things.*

II *That thing is naturall, which is by Nature, not by Art*

FOr whatsoever this visible World hath, comes all, either from Nature or from Art. those things are from Nature which God brought forth in the beginning, or wch are to this very time begotten: by a virtue implanted in things, as, the Heavens, the Earth, the Sea, Rivers, Mountains, Stones, Metals, Hearbs, living Creatures, &c. those things are from art which men have shaped, by putting a new form upon natural things; as, Cities, Houses, Ponds, Channels, Statues, Coines, Garments, Books, &c. that is by the work of mans ingenuity and hands. Physicks have nothing to do with these things; these are put over to the arts.

Now seeing that nature is before art: ye that art imitates nothing but nature, for as much as it doth nothing but by the strength of nature: it necessarily follows, that nature is to be laid for a foundation to arts, and that nature must first be knowne by those that are studious of arts, what things, and by what vertue it operates every where. for when this is known, the secrets of all arts open of their own accord, without this in arts and prudentials all wil be blinde, dumbe, and maimed: therefore Physick is so necessary to be premised before the Mathematical, and Logical, and also the prudentiall Arts, that they who do otherwise, may be thought to build castles in the air.

III *The nature of things is, the law of being born and of dying, of operating and of ceasing, which God the Workmaster hath laid upon all things that are.*

For all things are born and die: all things operate somewhat, and all things cease again: in an order and manner proper to every creature. which order and manner being that it is with most excellent reason, could not be disposed, but by the supream wildome, inasmuch as it is found constantly to be imposed by way of a law upon things

now

now it took the name of nature from the first degree of mutation of every thing, which is, to be borne.

IV *The knowledge of nature is to be obtein'd by searching into Nature it self.*

By searching I say. For no one should spend his time in Physicks, to that end, that he might have his mind taken up with anothers conceits; but that he may put forward himself to the through and intimate knowledg of things, otherwise the intellect will not be illustrated with the nature of things, but obumbrated with the speculation of phantasms in naturall things, therefore we are to seek for guides who may make us scholers, not of themselves, but of nature, and exhibite unto us not their own fond reasons, but nature.

V *To search Nature, is to contemplate, how, and wherefore, every thing in nature is done.*

To contemplate I say. For as we do not see the Sun, but by looking on the Sun; so we do not learn nature, but by looking into nature; which is that the Scripture counsels us. *Ask the beasts, and they shall teach thee, and the fouls of the aire, and they shall tell thee, or talk with the earth, and it shall an-*

swer thee, and the fishes of the sea shall declare unto thee. (*Job* 12.7.) therefore the learners of naturall Philosophy, cannot be more happily and easily instructed, then if they be taught by ocular demonstration, wheresoever it is to be had: *I say to contemplate every thing*, that so we may sift out the reasons and causes of all things every where. For it is certain that nature doth nothing in vain, even in things of least moment, yea sometimes in the very least things much wisdome lies stored up. And which is more, we cannot attain to the knowledg of great things, but by the knowledg of lesser things, which the following Aphorisme will teach us.

VI *Nature unfolds her self in the least things, and wraps up her self in the greatest things.*

That is, in the more excellent creatures many things are wound up and woven together with such an occult artifice, that neither the beginning nor the endings of actions and accidents can easily be discerned, but in all courser creatures, all things are clearly manifest, which is the cause why the nature of compounds cannot be knowne, unlesse the nature of simples

be

be first known: so consequently we are to begin with these speculations, and to proceed by degrees from simpler things to the more compound: which very order we shall see that the Creator himself observed, in producing and twisting together the nature of things.

VII *Wee are to studie naturall Phylosophie by the guide of sense, and light of the Scripture.*

For sense is the beginning not onely of knowledge, but of certainty and wisdome; for as there is nothing in the intellect which was not first in the sense, so if there be any thing obscurely or doubtfully in the intellect, we are to have recourse to the sense for evidence and certainty. but whereſoever sense or reason faileth, (as in things remote either in place or time) we are indebted to the grace of God, that he hath deigned to reveale many things unto us exceeding sense and reason. For example, the first production of the world, and the constitution of things invisible.

He that neglecteth either of these principles is easily intangled in errours: for by how much the more of imagination any thing hath, by so much the more vanitie it

hath, and is the more remote from the truth: again, by how much the leſſe any thing participates of revealed wiſdome, by ſo much the leſſe it partakes of the truth. and ſuch for the moſt part is the Philoſophy of the Gentiles, and therefore vain and barren, we will follow the guidance of *Moſes*, (who deſcribed the generation of the world by the command of God:) yet always heedfully obſerving the atteſtation of the ſenſes, and of reaſon. For wiſely doth *Lud. Vives* (as we have ſet down under the title of this book) recall Chriſtians from the lamp of the Gentiles, which yeilds an obſcure and maligne light, to that torch of the Sun, which Chriſt the light of the World brought into the world, attributing much wit indeed, but little profit to the inventions of *Ariſtotle*. nay further *Campanella* and *Verulamius* moſt Chriſtian Philoſophers (that are acquainted with that way of Philoſophy from ſenſe and Scripture) have demonſtrated that all *Ariſtotles* doctrines are nothing but a nurſerie of diſputations, (that is, of obſcurities, hæſitancies, contradictions, ſtrifes, and wranglings) and fighting hood-winckt, and that they hinder rather then advance our meditation of things, and withall have afforded

us

us a light, whereat we may kindle more clear torches of inquiring out the truth. following vvhose footsteps (yet laying strong foundations from the Scripture) vve vvill dresse out a little Theatre of nature, not for disputation, but for speculation; and vve vvill go through nature silently, yet not vvithout our eyes, and that again according to the counsel of great *Vives*: *Here is no need of disputations*, (saith he) *but of a silent contemplation of nature: the Scholars shal enquire and ask rather then contend: If any be more slow they wil need more ful commonstration not disputation*, and a little after, *again I say, here is no need of wrangling but of looking on, so this study wil be the delight of the rich, and a refreshing of the mind to those that deal either in publike or in private affairs: for when shal we easily find any other delight of the senses, to be compared with this, either in the greatness or in the variety, or in the continuance of it; for when we bestow our labour upon this contemplation, wee need not seek for any other recreation, nor desire sawce for this meat, the walk it self, and the quiet contemplation is both a School and a Master, as that which always affords something, which thou mayest admire, wherein thou mayest delight. Which may increase thy knowledge.*

There-

Therefore let us reſolve upon this, vve that vievv naturall things, to reſt upon no other authority beſides that of the Work-maſter of nature, and of nature her ſelf (as ſhe holds forth her ſelf to be touched and felt) the Scriptures, ſenſe and reaſon, ſhal be our Guides, Witneſſes and Dictators, to the Teſtimonies of vvhich he that aſſents not, ſhevvs himſelfe very fooliſh and vain.

CHAP.

CHAP. I.

An Idea of the World to be created and created.

THe eternall Deitie, our God that is to be adored, after the infinite glories which hee enjoyes in his immenſe eternity, was of his exceeding *goodneſſe* propenſe to communicate himſelfe out of himſelf; and by his exceeding *Wiſdome* ſaw that his inviſible things might be expreſſed by certain viſible images; and to execute that, had his *Omnipotencie* at hand, he decreed not to envie entitie to thoſe things, wherein he might be expreſſed, and wherein his *Power, Wiſdome and Goodneſs* might be revealed: therefore he produced intelligent creatures, by whom he might be known & praiſed *Angels and men:* both after his own image: but the firſt pure minds, the other clothed with bodies for whom he built a dwelling place, and as it were a ſchool of wiſdome, this univerſall World with other creatures of inferiour degree almoſt infinite: all and every of which, cry out after their manner, *hee made us, and not wee our ſelves.* Now then we go about to unfold in what or-

order so great a work proceeded, and with what art all things were contrived, and with what strength they are held together, yet by his guiding who alone is able to testifie of himself and of his works; for thus, says he, by his Secretary *Moses*. *Gen.* 1.

I *In the beginning God created the heaven, (v. 1.)* That is, the heaven of heavens with the Angels: whom as morning stars first produced, he made spectatours of the rest of his works. *(Job. 38. v. 7.)*

II *And the earth)* that is this visible world, which notwithstanding he did not finish in the same moment, therefore it is said.

III *And the earth was void, & without form, and darkneſſe was upon the face of the deep. v. 2.* that is, the matter of this world was first produced, a certain *Chaos* without form and darke, like a black smoake arising out of the bottomlesse pit of nihilitie, by the beck of the Almighty, and this was matter, the first principle of this visible World.

IV *And the Spirit of God moved upon the water,)* that is a certaine strength was introduced by the spirit or breath of God into that same darke, and of it selfe confused matter, whereby it began to stirre. hereby then is understood *the second principle of*

the

the World, that is, *the ſpirit of life diffuſed throughout*, whereof the Univerſal World is hitherto ful; which inſinuating it ſelfe every where through all the parts of the matter, cheriſhes and rules it, and produces every creature, introducing into every one its own form, but being that this work-maſter had need of fire to ſoften and to prepare the matter, variouſly for various uſes, God produced it. For,

V *God ſaid let there be light and there was light, ver. 3.)* this is deſcribed, as the third principle of the World, meerly active, whereby the matter was made viſible and diviſible into forms, *the light*, I ſay, perfecting all things which are, and are made in the World, therefore it is added.

V I *And God ſaw the light that it was good, ver. 4)* that is, he ſaw that all things would now proceed in order. for that light being produced in a great maſſe, began preſently to diſplay its threefold virtue (of illuminating, moving it ſelfe, and heating,) and by turning about the World, to heat and rarifie the matter, and ſo to divide it. for hence followed firſt of all from the brightneſſe of that light the difference of nights and days.

V I I *He divided the light from darkneſs, and*

called

called the light day, and the darkneſſe he called night, and the evening and morning were the firſt day, ver. 5.) that is, that light when it had turn'd it ſelf round, & compaſſed the World, with that motion made day and night.

The ſecond effect of light was from heat, namely, that which way ſoever it paſs'd, it rarified and purified the matter, but it condenſed it on both ſides, upward and downward. whence came the diviſion of the Elements, this *Moſes* expreſſes in theſe words.

VIII *And God ſaid, let there be a Firmament, that it may divide betwixt the wa er above and the waters below, ver. 6.)* God ſaid, that is, he ordained how it ſhould be. let there be a Firmament, that is, let that light ſtretch forth the matter, and let the thicker part of the matter melting and flying from the light thereof, make waters on this ſide and on that. above, as they are the term of the viſible World; but below, as they are a matter apt to produce other creatures, under which the earth as thick dregs came together. that was done the ſecond day.

XI *Therefore God ſaid, let the waters be gathered together under heaven into one place, and let the dry land appear. and it was ſo; and God called the dry land, earth, and the gathering together*

ther of the waters he called seas, and he saw that it was good. ver. 9, 10.) and so on the third day, there came the foure greatest bodies of the World out of the matter already produced, *Æther*, (that is, the Firmament or Heaven) Aire, Water and Earth; all as yet void of lesser creatures. therefore said God.

X *Let the earth bud forth the green herb, and trees bearing seed or fruit every one accoraing to his kinde ver. 11.)* this was done the same third day, when as now the heat of Cœlestiall light having wrought more effectually began to beget fat vapours on the earth, whereinto that living spirit of the World insinuating it self, began to cause plants to grow up in various formes, according as it pleased the Creator. this is the truest original and manner of generation of plants hitherto, that they are form'd by the spirit with the help of heat. but as the heavens did not always equally effuse the same heat, but according to the various form of the World, one while more mildly, another while more strongly; the fourth day God disposed that same light of heaven, otherwise then hitherto it had been, namely, forming from that one great masse thereof divers lucid Globes, greater and lesser, which (being called

called stars) he placed here and there in the Firmament higher and lower, with an unequall motion, to distinguish the times, and this *Moses* describes *v.* 14, 15, &c. thus.

X I *And God said, let there be light made in the Firmament of heaven, that they may divide the day and the night, and may be for signes, and for seasons, and for days, and for years, that they may shine in the Firmament, and enlighten the earth, therefore God made two great lights, and the starres, &c.)* This done, then after, all the face of the World began to appear beautifull, and the heat of heaven more temperate, began to temper the matter of inferiour things together, after a new manner; so that the spirit of life now began to form more perfect creatures, namely moving plants, which we call animals, of which *Moses* thus.

X I I *God said also, let the waters bring forth creeping things, having a soul of life, and flying things upon the earth, &c. v.* 20.) the waters were first commanded to produce living creatures, because it is a softer Element then earth: first *reptiles*, as earth-wormes, and other worms, &c.) because they are as it were the rudiment of nature, also swiming things, and flying things, that is, *fishes and birds*, animals

mals of a more light compaction; that was done on the fift day with a moſt goodly ſpectacle to the Angels; but on the ſixth day, God commanded earthly animals to come forth, namely of a more ſolid ſtructure, which was preſently done, when the ſpirit of the World diſtributed it ſelf variouſly through the matter of the clay: for thus *Moſes*.

XIII *God ſaid, let the earth produce creatures, having life according to their kind, beaſts, and ſerpents, and beaſts of the field, and it was ſo.* v. 24. So now the heaven of heavens had for inhabitants, the Angels; the viſible heaven, the ſtarres, the air birds, the water fiſhes, the earth beaſts, there was yet a ruler wanting for theſe inferiour things, namely, a rationall creature, or an Angel viſibly clothed, for whoſe ſake thoſe viſible things were produced. Therefore at the laſt when God was to produce him, he is ſaid by *Moſes* to have taken counſel; in theſe words.

XIV *Then God ſaid, let us make man after our own image, and likeneſſe, who may rule over the fiſhes of the ſea, and the fouls of the air, and beaſts, and all the earth, &c. Therefore he created man out of the duſt of the earth, and breathed in his face the breath of life, &c. v.* 26. and

chap.

cap. 2. *v.*7.) so man was made, like to the other living creatures by a contemperation of matter, spirit and light; and to God and the Angels, through the inspiration of the mind, a most exquisite summarie of the world. and thus the structure of the Universe ought to proceed, so as to begin with the most simple creature, and end in that which is most compound but both of them rationall; that it might appear, that God created these onely for himself, but all the intermediate for these. Lastly, that all things are from God, and for God, flow out from him, and reflow to him. But that all these things might continue in their essence, as they were disposed by the wisdome of God, he put into every thing a virtue, which they call *Nature*, to conserve themselves, in their essence, yea, & to multiply, whence the continuation of the creatures unto this very day, and this *Moses* intimated, adding touching animals.

XV *And God said, increase and multiply*, *v.* 22.) by the virtue of which command and words, *let there be made*, *let it produce*, *let it put forth*, &c. Things are made and endure hitherto, and would remain (if God would) without end unto æternity. Gods omnipotencie.

tency concurring no longer immediately unto particular things, (as before) but nature it self, always spreading forth her vertue through all things. which thing derogates nothing from the Providence of God, nay rather it renders his great power, wisdome, & goodnes, more illustrate. for it comes from his great goodness, that the greatest and the least things are so disposed to their ends, that nothing can be, or be made in vain; from his wisdome, that such an industry is put into nature to dispose all things to their ends, so that it never happens to erre, unlesse it be hindred: lastly, from his power, that such an immutable durability can be put into the universe, through such a changeable mutabilitie of particulars, so that the World is as it were æternall.

Therefore the veins of the strength, artifice and order of this nature must be more throughly searched; that those things which we have here in few words hinted out of *Moses*, may be more illustrated by the constant testimony of Scripture, reason and senses, and a way made to observe one thing out of another.

An Appendix to the first Chapter.

We have said that it may be gathered out

of those words of *Moses*. *In the beginning God created the heaven*: that *the invisible World* was the beginning of the works of God, that is the heaven of heavens with the Angels Now that by this heaven is to be understood the heaven of heavens, and the Invisible, or Angelicall World appeares plain.

I. *Out of Scripture*, which 1 mentions the heaven of heavens every where; but their production no where, unlesse it be here. 2 *Moses* testifies that the invisible heavens were stretched out the second day, and the fourth day adorned with starres. therefore another heaven must necessarily be understood in this place; namely a heaven that was finished in the same moment, for that the particle *autem* infeires, hee created the heavens and the earth; *terra autem*, but the earth was without form, &c.

III This *reason evinces the same*, those things which are made by God are made in order, now an orderly processe in operation, is this, that a progresse be made from more simple things, to compound things, therefore as the most compound creature man was last produced; so the most simple and immateriall creatures, (*Heaven and the Angels*) first of all. III. *And*

III *And what would we have more?* God himself testifies expresly; that when he made the earth, the Angels stood by him as spectators, for so saith he to *Job*; *Where wast thou when I founded the earth, when the morning starres sang together, and all the sonnes of God shouted.* (*Job.* 38. 4, 7.) calling the Angels morning starres, because they were a spirituall beam, and that newly risen: sonnes of God, because they were made after the image of God. therefore when we hear, that the earth was founded the first day, it must needs be that the Angels were produced before the earth: And if the Angels, then certainly the dwellings of the Angels, the heaven of heavens; and that in full perfection, with all their hosts, as it were in one moment, and this is the cause why *Moses* speaks no more of that heaven, but descends to the forming of the earth, that is the visible World: (how the Creator took unto himself six dayes to digest it) as we will also now descend.

CHAP. II.

Of the visible Principles of the World, matter, spirit and light.

WE have seene, God shewing us, how the World arose out of the Abysse of nihilitie; let us now see how it standeth, that so by seeing we may learn to see, and by feeling to feel, the very truth of things.

And here are three principles of visible things held out unto us, matter, spirit, and light, that they were produced the first day, as three great but rude Masses, and out of those variously wrought, came forth various kinds of creatures, *therefore we must enquire further, whether these three principles of all bodies, have a true being, and be yet existent.* least any errour be perhaps committed at the very entrance, by any negligence whatsoever, but now seeing that no more doubts of *matter*, and *light*, this onely comes to *be prooved, that by that spirit which hovered upon the face of the waters, a certain universall spirit of the world, is to be understood*, which puts life and vigour into all things created, for

for the newneſſe of this opinion in phyſicks, and the interpretation of that place by Divines with one conſent of *the perſon of the holy ſpirit*, give occaſion of doubting. But *Chryſoſtome*, (as *Aſtacus* cites him) and *Danæus* acknowledgeth, that in this place a created ſpirit, which is as it were the ſoul of the world, is more rightly to be underſtood; and it is proved ſtrongly.

I *By Scripture*, which teſtifieth that a certain vertue was infuſed by God through the whole world, ſuſteining and quickening all things, and operating all things in all things; which he calleth both a *ſpirit* and a *ſoul*, and ſometimes the *ſpirit of God*, ſometimes the *ſpirit of the creatures*.

For example (*Pſal.* 104.v.29.30.) *David* ſaith thus; *when thou receiveſt their ſpirit*, (that is the ſpirit of living creatures, and of plants) *they die, and return to their duſt: but when thou ſendeſt forth thy ſpirit* (that is the Spirit of God,) *again, they are recreated, and the face of the earth is renewed*, but *Job* (27.3.) ſays thus; *as long as my ſoul ſhall be in me, and the ſpirit of God in my noſtrils*; ſee the ſoul of man, and the ſpirit of God are put for the ſame! which place compared with the ſaying of *Elihu*, *the ſpirit of God hath*

made me, and the breath of the Omnipotent hath put life into me. (*c.* 33. *v.*4.) opens the true meaning of *Moſes*; namely that the *ſpirit* of God ſtirring upon the waters, produced the *ſpirit* or *ſoul of the world*, which puts life into all living things. Now that this is diſpoſed through all things, appears out of *Ezechiel*: where God promiſing the ſpirit of life unto the dry bones, (*Ezech.*17.*v.*5,14.) which he cals *his* Spirit, bids it to come from the four Winds (*v.*9) therefore *Auguſtine*, (*lib.imperf. ſup.Gen.ad lit.*) and *Baſil* (in *Hexamero*) call this ſpirit, *the ſoule of the world*. And *Ariſtotle* (as *Sennertus* teſtifies) ſays that the ſpirit of life is a *living and genitall eſſence diffuſed through all things* but the teſtimony of *Elihu*, is moſt obſervable, who ſpeaks thus. *Who hath placed the whole World? If he* (namely God) *ſhould ſet his heart upon it, and ſhould gather unto himſelf the ſpirit thereof, and the breath thereof* (or: his ſpirit and his breath: For the Hebrew affix is rendred both ways) *all fleſh would die together, and man would return unto duſt. Job* 34.*v.*13,14. So, if God ſhould take his ſpirit out of the World, every living thing would die.

2 *By reaſon and ſenſe*, it is certainly evident, that herbs and animals ſpring out of a humide matter, even without ſeed. But

whence had these life, I pray you, but from that diffused soul of the World? wee finde by experience, that bread, wine and water, yea aire, are vitall to those that feed upon them, but whence have they that vital force, I pray you, if not from this diffused soule? but now if a certaine spirit be diffused in that manner through all things, it follows necessarily, that it was created in the beginning in its whole masse, even as the matter & the light were first produced, in that its great and undigested masse: so that there was no need that any thing should be created afterwards, but be compounded of those three, and distinguished with forms. which God intimated, in *Esay* 42. *v.* 5. where declaring himself the Creator of all things, he divides them into three parts, namely, *into the heavens*, (that is light. *the earth*, (that is matter) *and a quickning spirit*, and just so in *Zackary* 12. *v.* 1. let us therefore hereafter beware so great an absurdity, (that I may not say blasphemy) as to put the person of the Holy Ghost amongst the creatures.

Now there may three reasons of this thing be given, why *Moses* called that quickning spirit, produced in the beginning, the Spirit of God. Namely, that it is taken in that sense, wherein elsewhere it is spoken of the

mountains of God, (Psal.36.v.7.) and trees of God (Psal.104.v.16.) and *Ninive* was called *a citie of God:* that is, by reason of their greatnes and dignity.

2 Because it was produced immediatly by God; not as now it is, when that spirit passeth from one subject to another.

3 Because it was a peculiar act of the holy Ghost.

For the Analogie of our Faith teacheth us to believe, that the production of the matter out of nothing, is a work of Gods Omnipotencie, and is attributed to the Father; that the production of light (by which the World received splendour and order) *is a work of wisdome attributed to the Son; (John 1.v.3,4.) and lastly, that the virtue infused into the creatures, is a work of his goodnesse, which is attributed to the Holy Ghost. (Psal.143.v.10.)* and so must that place *(Psal.33.v.9. & 6.)* be altogether understood, (for it will not bear any other sense) *he spake and they were made; he commanded, and they came forth: the heavens were established by the Word of God, and all the virtue of them by the spirit of his mouth.* Also wee must note, *(Gen.1.v.1,2,3.)* that three words are added to the three principles, *be created, he said, and he moved himself*; that they may be

signe

ſigns of his abſolute *Power, of his Word, and of his ſpirit.* Alſo we muſt note this, that in both thoſe places the Holy Ghoſt with his work is placed in the midſt; (as alſo in *Eſay* 40. *v.* 13.) becauſe he is the ſpirit, the love, and the mutuall bond of both, but this we ſpeak after the manner of men

Let it ſtand therefore for certain, that all the principles were created the firſt day, every one in its maſſe; and that all things were afterwards compoſed out of them, which may be declared to children (for their more full underſtanding) by a ſimilitude thus: an Apothecary or Confectioner being to make odoriferous Balls, takes Sugar in ſtead of matter; Roſe-water, or Syrrup, or ſome other ſweet liquour for tincture or conditure; laſt of all taking ſome of this lumpe thus made, hee imprints certain ſhapes upon his vvork. So alſo God firſt prepared his *matter:* then tempered it with a *living ſpirit*; then *brought light into it*, which by its heat and motion might mix and temper both together and bring it to certain forms. alſo even as a Mechanick muſt have matter, and two hands to work withall; the one hand, to hold; and the other to work with: ſo in the framing of the world, there was need,

firſt

first of matter, then of a spirit to frame the matter, and lastly of light, or heat to inactuate the matter under the hand of the spirit. and what need many words? we see in every stone, hearb, and living creature: first a certain quantity of matter; secondly, a certain inward virtue, whereby it is generated, it groweth, it spreads abroad its savour, and its odour and its healing virtue; thirdly, a form or a certain disposition of parts with divers changes, which come from the heat working within. For,

Matter, Light, Spirit } is a principle { meerly *passive*, meerly *active*, *indifferent*, for in respect of the matter it is active; in respect of the light, passive.

The definitions of the principles.

Matter, is a corpulent substance, of it self rude and dark, constituting bodies.

Spirit, is a subtile substance, of it self living, invisible and insensible, dwelling and growing in bodies.

Light, is a substance of it self visible, and moveable, lucid, penetrating the matter, and preparing it to receive the spirits, and so forming out the bodies.

There-

Therefore by how much the more	*Matter*,	any thing	Dulnes, obscurity & immobility: as the earth.
	Spirit,	hath it hath	Vigour and durability: as an
	Light,	somuch & more	Angell. Form, & mobility: as the Sun.

Note also; that matter, is the first *entitie* in the World; Spirit, the first living thing; Light, the first moving thing; so that every body in the World is of the matter, by the light, in the spirit: which he would have to be his image, *from whom, by whom, in whom are all things, blessed for evermore*, Amen. *Rom.* 11 *v.* 36.

Of the nature of matter.

TRuly said one; *No diligence can be too much in searchingout the beginning of things.* for when the principles are rightly set down; an infinite number of conclusions will follow of their own accord, and the science wil encrease it self *in infinitum*; which the creation of things doth also shew. For God having produced the principles the first day, and wrought them together with most excellent skil, made afterward so great variety of things to proceed from them, that both men

men and Angels may be astonished. Therefore let us not thinke over-much, to frame our thoughts yet of all the principles of the World apart.

Let the following Aphorisms be of the matter.

I *The first matter of the World, was a vapour or a fume.*

For what means that description of *Moses* else? when he calls it *earth, waters, the deep, darkness, a thing void, and without form?* and it appears also by reason. for seeing that the lesser bodies of the World, Clouds, Water, Stones, Metals, and all things growing on the earth are made of vapours coagulated (as shall appeare most evidently hereafter:) why not the whole World also? certainly the matter of the whole can be nothing else, but that which is found to be the matter of the parts.

II *The first matter of the World, was a Chaos of dispersed Atomes, cohering in no part thereof.*

This is proved 1 *by reason*, for if they had cohered in any sort, they had had form: but they had not; for it was *Tohu vabohu*, a thing without form and void. 2 *by sense*, which satisfies, that the Elements are turned unto

Atomes,

Atomes. for what is duſt, but earth reduced into Atomes ? what is vapour, but water reſolved into more ſubtile parts? the air it ſelf, what is it but a moſt ſmall comminution of drops of water,and unperceiveable by ſenſe? yea, all bodies are found to conſiſt of moſt extream ſmall parts, as trees , barke , fleſh, skins,and membranes,of moſt ſlender ſtrings or threds ; but bones,ſtones, metals,of ſmal duſt made up together,into which they may be reſolved again. And this ſhews alſo, that thoſe threds or haires , are of Atomes, as it were glued together , that when they are dried they may be pouldred. wherefore the whole World is nothing but duſt , coagulated with various glutinous matters into ſuch or ſuch a form. 3 *by Scripture* for the æternall Wiſdom it ſelf teſtifies , that *the beginning of the World was duſt.* (*Prov.*8.*v.*26.) out of which foundation many places of Scripture wil be better underſtood : (as *Gen.* 3.*v.*14.) *duſt thou art, and into duſt thou ſhalt return.* For, behold, man was made of the mud of the earth ! yet God being angry for ſin, threatens ſomthing more , then returning to duſt , namely utmoſt reſolution, into the very utmoſt duſt , of which the mud of the earth it ſelf was made : and wee ſee it to

be

be truly so, that a man is dissolved not onely into earth, but into all the elements, (especially those that perish by fire) and is at last scattered into very Atomes. Read and understand, what is said (*Job* 4.*v*.19.) *Item* 19.*v*.9. *Esay* 26.*v*.19. *Psal*.104.*v*.29.) therefore, *Democritus* erred not altogether, in making Atomes the matter of the World: but hee erred in that hee believed, 1 that they were æternall, 2 that they went together into forms by adventure, 3 that they cohere of themselves: by reason that he was ignorant of that which the Wisdom of God hath revealed unto us, that the Atomes were conglutinated into a mass, by the infusion of the Spirit of life, and began to be distinguished into forms, by the comming in of the light.

III *God produced so great a mass of this matter, as might suffice to fill the created Abysse.*

For with the beginning of the heaven and the earth, that vast space was presently produced, wherein the heaven and the earth were to be placed, which place *Moses* cals the *Abysse*, which no creature can passe through by reason of its depth and vastness. Now the Aphorism tels us, that all this was filled

filled up with that confuſed fume, leſt wee ſhould imagine any *vacuum*.

IV *The matter is of it ſelf inviſible, and therefore dark.*

For darkneſs is ſeen after the ſame manner when the eyes are ſhut, as when they are open; that is, they are not ſeen at all. and this is it, which *Moſes* ſays: *and darkneſſe was upon the face of the Abyſſe.*

V *The matter is of it ſelf without form yet it is apt to be extended, contracted, divided, united, and to receive every form and figure, as wax is to receive every ſeal.*

For we have ſhewed that all the bodies of the World are made of theſe Atomes, and are reſolved into them, therefore they are nothing elſe but the matter clothed with ſeverall forms. which the Chymicks demonſtrate to the eye, reducing ſome duſt one while into liquour, another while into a vapour, another while into a ſtone, &c.

VI *The matter is æternall in its duration through all forms, ſo that nothing of it can periſh.*

For in very deed, from the making of the World untill now, not ſo much as one crum of matter hath periſhed, nor one increaſed. for in that bodies are generated, and do periſh

riſh that is nothing elſe, but a tranſmutation of forms in the ſame matter, as when vapour is made of water, of that vapour a cloud, of the cloud rain, and of the rain drunk in by the roots of plants an hearb, &c.

VII *The principall virtue of the matter of the world is, an indiſſoluble coherence every where, ſo that it can endure to be diſcontinued in no part, and a vacant ſpace to be left.*

Notwithſtanding perhaps this virtue is not from the matter, but from the ſpirit affuſed: of which in the Chapter following.

VII *From this matter, the whole World is materiall and corporeall, and is ſo called.*

For all the bodies of the World, even the moſt ſubtle, and the moſt lightſome, are nothing but form, partly coagulated, partly refined. Now after what manner it is coagulated or refined, ſhall appear in that which follows.

Of the nature of the Spirit, or ſoule of the World.

THe ſpirit of the World, is life it ſelf infuſed into the World, to operate all things in all. for whatſoever any creature doth or ſuffers, it doth or ſuffers it by virtue of this ſpirit. for it is given to it.

I *To inhabite the matter.*

For as in the beginning it moved it self upon the waters, so yet it is not extant, but in the matter; especially in a liquid and subtile matter. Whence in the body of a living creature, those most subtile, sanguine vapours, and as it were flames, which are the charriot of life, are called spirits. And Chymicks, extracting a spirit out of herbs, metals, stones like a little water, call it the *Quintessence*, because it is a more subtile substance than all the four elements. But not water it self, as it is water, but that living virtue of the creature, out of which it is extracted, inhabiting in it. which being that it cannot be altogether separated from the matter, is preserved in that subtile form of matter. For how fast the spirit inhæres in the matter, shall be taught about the end. (*hap.* 9.10.

II *To move or agitate it self through the whole matter to preserve it.*

Hence it is, that no *vacuum* can be in the world. For all bodies, even the most subtile, (as water, air, the skie) being indued with this spirit, delight in contiguity and continuity. For as a living creature will not be cut, so also water, air, yea the world it

ſelf; by reaſon of that univerſall ſpirit, uniting all things in it, which alſo when a ſeparation is made (as in the wounds of living creatures, in the cutting of the water, in the parting of the air may be ſeen) makes the matter cloſe again. 2. that every creature putrifies, when that ſpirit is taken away, (as if you extract the ſpirit of wine out of wine, or ſuffer the ſpirit to evaporate out of an hearb, &c.) but is preſerved, yea made better, if the ſpirit be preſerved. For example; wine kept in any ſolid veſſel under the earth, or water, though it be an 100 years; grows ſtill the richer: the ſpirit ſtirring and moving it ſelf in it, and by that meanes, ſtill moulding the matter more and more, and more and more purifying it from crudities.

III *To keep the particular Ideas or forms of things.*

For one & the ſame ſpirit of the univerſe, is afterwards diduced into many particularities, by the comand of God; ſo that there is one ſpirit of water, another ſpirit of earth, another of metals, another of plants, another of living creatures, &c. and then in every kind again ſeverall ſpecies. Now then that of the ſeed of wheat, there ſprings not a bean, much leſſe, a walnut, or a bird, &c.

is

is from the ſpirit of the wheat, which being included in the ſeed, formeth it ſelf a body according to its nature. From the ſame ſpirit is the cuſtody of the bounds of nature. for example; that a horſe grows not to the bigneſſe of a mountain, nor ſtays at the ſmalneſſe of a cat.

IV *To form it ſelf bodies, for the uſe of future operations.*

For example, the ſpirit of a dog being included in its ſeed, when it begins to form the young, doth not form it wings, or fins, or hands, &c. becauſe it needeth not thoſe members: but four feet, and other members, in ſuch ſort, as they are fit for that uſe, to which they are intended. Becauſe ſome dogs are for pleaſure, others to keep the houſe, or flocks, others for hunting; and that either for hares, or wild bores, or water foul, &c. (namely, according as the Creator mingled the ſpirit of living creatures, that they ſhould have Sympathy or Antipathy one with another) Every ones own ſpirit doth form it a body fit for its end. whence from the ſight of the creatures onely, the uſe of every one may be gathered, as the learned think; becauſe every creature beareth its ſignature about it.

Of the nature of light.

I THe *first light was nothing else but brightnesse, or a great flame, sent into the dark matter to make it visible and divisible into form.*

For in the primitive language, light and fire are of the same name אור and אור, whence also comes the Latine word *URO.* and verily the light of heaven, doth really both shine and burn, or heat.

II *God put into the light a threefold vertue: 1 of spreading it self every way, and illuminating all things. 2 of moving the matter with it being taken hold of, by burning and inflaming. 3. of heating, and thereby rarifying and attenuating the matter.*

All these things our fire doth also: because it is nothing else, but light, kindled in the inferiour matter.

III. *But when as that light could not extend his motion upwards and downwards, (for it would have found a term forthwith) it moved it self, and doth still move in a round: whence came the beginning of dayes.*

IV *And because the matter rarified above heat being raised by the motion of the light, the grosser parts of the matter were compelled to fall downward, and to conglobate themselves in the middest of the Universe: which was the beginning of the earth and water.* V *The*

V *The light therefore by this its threefold vertue, light, motion, and heat) introduced contrariety into the World.*

For darkneſſe was oppoſite to light; reſt, to motion; cold, to heat: whence came other contraries beſides, moiſt and dry, thin and thick, heavy and light, &c. of which c. 4.

VI *From the light therefore is the diſpoſition and adorning of the whole World.*

For the light is the onely fountain both of viſibility, and of motion, and of heat. take light out of the World, and all things will return into a *Chaos*. For if all things loſe their colours and their formes, in the night when the Sun is abſent; and living creatures and plants die in winter, by reaſon of the Suns operation being not ſtrong enough, and the earth and the water do nothing but freeze: what do you think would be, if the luminaries of heaven, were quite extinguiſhed? *Therefore all things in the viſible World throughout, are, and are made, of* the matter, *in* the ſpirit, *but by* the fire or light.

CHAP. III.

Of the motion of things.

THe principles of things being constituted, we are to see the commmon accidents of things: which are *Motion*, *Quality*, and *Mutation*.

For out of the congresse of the principles of the World, came first motion; out of motion, came quality: and out of quality again, came various mutations of things: which three are hitherto in all created things, as it shall appear.

I *Motion is an accident of a body, whereby it is transferred from place to place.*

The doctrine of naturall motions, how many they are, and how they are made, is the key to the understanding of all naturall actions: and therefore most diligently to be observed.

II *Motion was given to things, for generation, action, and time.*

For generation: for nothing could be gotten without composition: nor composed without comming together: nor come together without motion. For

For actions: because there could be none without motion

For time: that it might be the measure of the duration of things. For take the Sun and the Starres out of the World; nothing can be known, what, where, when: all things will be blind, dumb, deaf:

III *Motion is either simple or compound.*

IV *Simple motion is either of spirit, or of light, or of matter.*

V *The motion of the spirit is called agitation, whereby the spirit agitates it self in the matter seeking to inform it.*

For the living spirit would not be living, if it should cease to agitate it self, and strive to subdue the matter in any sort whatsoever. This motion is the beginning of the generation, and corruption of things. For the spirit in every thing (in flesh, an apple, a grain, wood, &c.) doth by agitating it self, soften the parts, that it may either receive new life, or it may fly out, and the thing putrifie.

VI *The motion of the light is called diffusion, whereby the light and the heat diffuse themselves into all the parts.*

For fire, were not fire, nor heat, heat, if it should cease to diffuse it self, and liquifie the

the matter And *from this motion of the fire, all the motion of the matter draws its originall:* as the experience of the ſenſes teſtifies. For groſſe and cold things, as wood, a ſtone, ice, &c. want motion of themſelves, which notwithſtanding when fire is put to them, they forthwith obtein, as it may be demonſtrated to the eye. let there be a kettle full of water, put wood underneath it; behold all is quiet! but kindle the wood, you ſhall preſently ſee motion: firſt in the wood, flame, ſmoak, and ſtarting aſunder the coals: by and by in the water, firſt evaporating, afterwards turning it ſelf round, at length, boyling and galloping. but remove away the fire again, all the motion will ceaſe again by little and little. ſo in a living body (an animall) take away heat, forthwith not onely motion, but alſo mobility will ceaſe, the members waxing ſtiffe. Furthermore, although there be divers motions in things, yet the Originall is every where the ſame, heat or fire: which being included in the world is moved circularly: being kindled in the air, as it darts it ſelf forth, this way or that way, as the matter is diſpoſed, or the wind ſits; included in a living creature, as the ſtrength of the phantaſie forceth it this way or that way.

VII *The*

VII *The motion of the matter is eightfold of expanſion, contraction, aggregation, ſympathie, continuitie, impulſion, libration and libertie.*

Whereof the firſt two are immediately from the fire, the four following from ſome other bodies; the two laſt from it ſelf, but bythe mediation of the ſpirit of the univerſe. which if it ſeems harſh, will ſoon appear plain by examples.

VIII *The motion of expanſion is, that whereby the matter, being rarified with heat, dilates its ſelf of its own accord, ſeeking larger room.*

For it is not poſſible that the matter being rarified, ſhould be conteined in the ſame ſpace: but one part thruſts another, that they may ſtretch forth themſelves, and gather themſelves into a greater ſphear. you ſhall ſee an example, if you drop a few drops of water into a hogs bladder, and having tied the neck thereof, lay it over a furnace, for the bladder will be ſtretched out, and will ſwell: becauſe the water being turned into vapour, by the heat ſeeks more room.

IX *The motion of contraction is, that whereby the matter is contracted, betaking it ſelf into a narrower ſpace by condenſation.*

For

For example; if you lay the foresaid bladder from the furnace into a cold place; for the vapour will return to water, and the swelling of the bladder will fall. or if you put a thong into the fire, you shall see it wil be wrinkled and contracted because the softer parts being extracted by the fire; the rest must needs be contracted: from the same reason also, the chinks and gapings of timber and of the earth come.

X *The motion of aggregation is, when a body is carried to its connaturals.*

For example, our flame goes upward, a stone goes downward: for the flame perceives, that its connaturals (that is subtile bodies) are above; a stone that its (that is heavy things) are here below. *Note well*, that they cómonly call this motion *naturall*, who are ignorant of the rest. But though it appear most in sight, and seem to be most strong and immutable, yet indeed it is weak enough; because it gives place to all the rest that follow, and puts not forth it self, but when they cease: which will of it self appear, to one that meditates these things diligently. yet I will adde this. A drop of ink fallen upon paper, defends it self by its roundnesse; yet put a moist pen to it, you shall

ſhall ſee the drop run up into into it. See, it goes not downward, (as it ſhould by reaſon of its heavineſſe) but upwards, that it may joyn it ſelf to a greater quantity thereof.

XI *The motion of ſympathie, and antipathy, is that, whereby a like body is drawn to its like, and driven away by its contrary.*

Now this ſimilitude is of the ſpirit that inhabits in it. this motion is very evident in ſome bodies, (as in the loadſtone, which draws iron to it, or elſe leaps it ſelf to the iron) in others weak, and ſcarce ſenſible, as for example in milk, the cream whereof ſeparates it ſelf by little and little, from the wheyie parts, and gathers it ſelf to the top) in ſome things, it is as it were bound; unleſſe it be loſed ſome way or other, that appears in melted braſſe: wherein metals are ſeparated one from another, by the force of the fire, and by the virtue of ſympathy every thing gathers it ſelf to its like, (lead to lead, ſilver to ſilver,) and flows together in a peculiar place.

XII *Motion of continuity is, that whereby matter follows matter, ſhunning diſcontinuity.*

As when you ſuck up the air with a pipe, putting one end thereof into the water, the wa-

water will follow the air, though it be upward For we said before, that the world as a living creature would not be cut, the living spirit uniting all things.

XIII *The motion of impulsion (or cession) is that whereby matter yeelds to matter, that presseth upon it.*

So water yeelds to a stone that comes down into it, that it may sink; so a stone, to the hand that thrusts it, &c. for a body will not endure to be penetrated, it had rather yeeld, if it can. If it cannot all, the parts yeeld, as wee may see it happen in every Breake, Bruise, Rent, Wearing, Cutting; for the weaker yeelds every where to the stronger.

XIV *The motion of libration is, that wherein the parts wave themselves too and fro, that they may be rightly placed in the Whole.*

As when a ballance moves it self, now this, now that way.

XV *The motion of liberty is, that whereby a body or a part thereof, being violently moved out of its place, and yet not plucked away, returns thither again.*

As when a branch of a tree bent forcibly and let go again, betakes it self to its positure.

A

A SCHEAME of Motions.

- Motion therefore is of
  - Spirit / Light — which is called the motion of
    - *agitation.*
    - *diffusion.*
  - Matter which is caused by
    - the fire and is called the motion of
      - *expansion.*
      - *contraction.*
    - some body
      - drawing by
        - *connaturalitie*, as of *aggregation.*
        - a secret virtue, as of *sympathie.*
        - connexion, as of *continuitie.*
      - thrusting or inforcing, *as of impulsion*
    - it self, (that it may be well with it self) as the motion of
      - *libration.*
      - *libertie.*

An example of all these motions in the formation of the Macrocosme or great World.

First, the spirit moved it self upon the waters with the motion of *Agitation*. then the light being sent into the matter, penetrated it every way with the motion of *Diffusion*. by and by the matter above, where the light passed through, being heated and rarified, dilated it self with the motion of *Dispansion*; but below, it coagulated it self with the motion of *Contraction*. And all the more subtle parts gathered themselves upwards, the grosser downwards, with the motions of *Aggregation* and *Sympathy*: (for a more occult Sympathy and Antipathy was put into things afterwards.) and whither soever one part of the matter went, others followed by the motion of *Continuity*: or if one rushed against others, they gave way by the motion of *Impulsion*. but the grosser parts did poise themselves, (flying from the heat which came upon them from above) about the Center, to an exact Globosity, with the motion of *Libration*. there was no motion of Liberty, because there was no externall violence, to put any thing out of order.

An example of the same motions in the Microcosme, or little World.

In

In man, (and in every living creature) the food that is put into the belly, grows hot with incalescency; here you have the motion of *Expansion*. then by the motion of *Sympathie* every member attracts to it self, that which is good for it: but by the motion of *Antipathy* superfluous things are driven forth, as unprofitable and hurtfull to them. then the blood is distributed equally to the whole body upwards and downwards by the motion of *Libration*. and being assimilated to the members, it is condensed, that it may become flesh, a membrane, a bone, &c. by the motion of *Contraction*. lastly, the air in breathing drawn in and let forth, shews the motion of *Continuity*, and *Contiguity*. (For when the lungs are distended, the air enters in, (least their should be a *vacuum*;) but when the lungs contract themselves, the air gives way:) the motion of *Liberty* will appear, if you either presse down, or draw up your skin: for as soon as you take away your hand, it will return to its situation. lastly, if you fall from any place, there will be the motion of Aggregation, for you will make toward the earth, as being weight and earth your self.

XVI *If motions be infolded, they either increase or hinder one anothers force.* You

You have an example of the first, if you cast a stone towards the earth, for here the motion of Aggregation and Impulsion, are joyned together. Of the latter, if you cast a stone towards heaven: for here the motion of Impulsion striveth against the motion of Aggregation, in which strife, the stronger at length, overcomes the weaker; the naturall that which is but accessory.

XVII *Compound motion is in living creatures, when they doe of their own accord, move themselves from place to place.*

Namely, birds by flying, fishes by swimming, beasts by running: of which we shall see Chap. 10. how every one is performed.

Also, naturall Philosophers call that a compound motion, when a thing is wholly changed, either to being or not being, or to another kind of being, though it continue in the same place, but we call these mutations, and they are to be handled in a peculiar Chapter, the third from this.

CHAP.

CHAP. IV.

Of the Qualities of things.

THe matter is variously mingled with the spirit,& light,by these various motions, and from this various mixture, come various qualities,so that this thing is called,& is such a thing,that such a thing,again,another such, or such a thing: which we must now consider; & these talities, or qualities,are some of them generall,common to all bodies; others speciall, proper to some creatures only. the first are to be laid open here together for all once, the other hereafter in their places.

I *A quality is an accident of a body, in regard of which every thing is said to be such or such.*

II *There are qualities in every body, as well intangible, spirituall, and volatile, as grosse, tangible, and fixed.*

For a body is (as we saw cap. 2. in the description of matter, *Aphor.* 8. and of the spirit *Aphor.* 1.

either { Intangible, or Nolatile, which they also call spiritual, as *breath, air.*
Tangible namely, { *water*, and all fluid things. / *earth*, and all consistent things.

The qualities therefore, which we will treat of, shall be common to all these. For it may be said, both of a stone, and of water, and of air, and of the spirit that is inclosed in a body, that it is fat or raw, hot or cold, moist, or dry, thick or thin, &c.

III *The qualities are the grounds of all forms in bodies.*

For the former causes a living creature to differ from a stone, a stone from wood, wood from ice, and the forme consists of qualities. Therefore the doctrine of qualities is exceeding profitable, and as it were the basis of naturall science; which because it hath been hitherto miserably handled, the light of physicks hath been maimed, and by that means obscure.

IV *A quality is either intrinsecall, and substantiall, or extrinsecall and accidentall.*

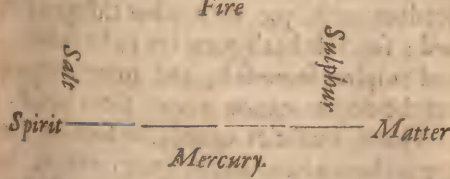
Of the substantiall qualities, Sulphur, Salt, and Mercury.

V *A substantiall quality arising from the first*

first mixture of the principles is threefold

Aquosity, *Oleosity*, *Consistency* — which the Chymicks call — *Mercury*, *Sulphur*, *Salt*.

N. 1 These flow immediately from the combination of the first principles.



For as in the beginning the spirit conjoyned with the matter, produced the moving of the waters; so *Mercury* is nothing but motion, the first fluid thing, which cannot be fixed, nor conteined within a limit; and *salt* is dry and hot, and uncorruptible, just as spirit and fire; it is preserved by fire, it is dissolved with water, or *Mercury*, but turns neither to flame, nor smoak, though it is a most spirituall creature, and every way incorruptible.

And *Sulphur*, what is it but matter mixt

with fire? for why doth it delight in flame, but that it is of a like nature? and in compound things, it is the first thing combustible, or apt to be inflamed.

N. 2. But beware that you understand not our vulgar minerall *Salt*, *Sulphur*, and *Mercury*, (or quicksilver.)

For these are mixt bodies: salt earth, sulphurie earth, Mercurial water: (that is, matter wherein Salt, Sulphur, and *Mercury*, are predominant, yet with other things adjoyned; for Salt hath parts apt to be inflamed, and Sulphur some salt, and some *Mercury*, but the denomination is from the chiefest.)

Those qualities cannot be seen as they are in themselves, but by imagination; but they are in all things, as Chymicks demonstrate to the eye: who extract crude and watery parts out of every wood, stone, &c. and other fat and oily parts; and that which remains, is salt, that is ashes; so the thing it selfe speaks, that some liquor is mercurious; (as vulgar water and flegme) other sulphury; (as oil and spirit of wine) other salt and tart (as *aqua fortis*) also we find by experience, in the benummings and aches of the members; that some vapours are crude, others sharp.

VI. *God produced the qualities intrinsecally, that the substance of every body might be formed. For*

☿	giveth unto things	fluidity, coition, crudity.	and from thence incombustibility.
Sulphur		fatnesse, cleaving together, fatnesse.	inflammability
Salt		consistency, hardness, aptnesse to break.	incorruptibility.

That Mercury giveth fluidity, and easie coition of the matter, appears out of quicksilver, which by reason of the predominancy of *Mercury*, is most fluid: so that it will not endure to be stoped or fixed. It is also most crude, so that it can neither be kindled nor burned: but if you put fire to it, flees away into air.

Now that the coagulation of bodies is from sulphur, as it were glue, appears from hence that there is more oil, in dry, solid, and close, bodies, then in moist bodies; also because ashes (after that the Sulphur is consumed, with five (if you power water on them clear not together in a lump, but with oil or fat, they cleave together. Now Chymicks extract oil out of every stone, leaving nothing but ashes, no part cleaving one to another any longer.

And that salt gives consistency, appears by the bones of living creatures, out of which Chymicks extract meer salt, also all dense things leave behind them much ashes (that is salt.)

God therefore with great counsel tempered these three qualities together in bodies. for if *Mercury* were away, the matter would not flow together to the generation of things: if *salt*, nothing would consist together, or be fixed; if *sulphur*, the consistency would be forced, and yet apt to be dissipated. Lastly, if there were not sulphur in wood, and some other matters, we could have no fire, but Solar, on the earth (for nothing would be kindled) and then what great defects would the life of man endure?

Of the accidentary or extrinsecall qualities of bodies.

So much of the substantiall qualities: the accidentary follow.

VII *An accidentall quality is, either manifest, or occult.*

VIII *A manifest quality is, that which may be perceived by sense, and is therefore to be called sensible.*

As heat, cold, softnesse, roughnesse.

IX *An*

IX *An occult quality is, that which is known only by experience, that is by its effect,* (as the love of iron in the loadstone, &c.) *therefore it is called insensible.*

N. The manifest qualities proceed from the diverse temperatures of the elements, & substantificall qualities; the occult immeditely from the peculiar spirit of every thing.

X *The sensible quality is five-fold, according to the number of the senses, visible, audible, olfactile, gustatile, tangible: that is colour, sound, odour, savour, tangour.*

Let not the unusuall word *tangor*, offend any; it is feigned for doctrines sake; and analogy admits it, for if we say from Caleo, *Calor*; from Colo, *Color*; from sapio, *sapor*; from amo, *amor*; from fluo, *fluor*; from liquo, *liquor*; from clango, *clangor*; from ango, *angor*? *why not also from tango, tangor*?

Of the tangible quality.

XI *The tangible quality (or tangor) is such, or such a positure of the parts of the matter in a body.*

XII *The copulations thereof are twelve; for every body in respect of touch, is,* 1 *rare or dense,* 2 *moist or dry.* 3 *soft or hard.* 4 *flexible or stiffe.* 5 *smooth or rough.* 6 *light or heavy.* 7 *hot & cold.*

Of every of which, we are to consider accurately, what and how they are.

XIII *Rarity, is an extension of the attenuated matter through greater spaces: density on the contrary, is a straighter pressing together of the matter into one.*

For all earth, water, air, and spirit, is sometime more rare, sometime more dense; and we must note that there is not any body so dense, but that it hath pores nevertheless, though insensible. That appears in vessels of wood and earth, which let forth liquors in manner of sweat; also in a bottle of lead filled with water, which if it be crushed together with hammers, or with a presse, sweats forth a water like a most delicate dew.

XIV *Humidity (or humour) is the liquidnesse of the parts of the body, and aptnesse to be penetrated by one another; siccity on the contrary is a consistency, and an impenetrability of the parts of the body.*

So a clot hardned together either with heat or cold, is dry earth, but mire is moist earth, water is a humid liquour, but ice is dry water, &c.

XV *Softnesse is a constitution of the matter somewhat moist, easily yeilding to the touch:*

hard-

hardneſſe is a dryneſſe of the matter not yeelding to the touch.

So a ſtone is either hard or ſoft, alſo water, ſpirit, air, &c.

XVI *Flexibility, is a compaction of the matter with a moiſt glue, ſo that it will ſuffer it ſelf to be bent: ſtifneſſe is a coagulation of the matter with dry glue, that it will not bend but break.*

So iron is ſtiffe, ſteel flexible. ſo ſome wood is flexible, other ſtiffe, but note that the flexible is alſo calld tough, the ſtiffe brittle.

XVII *Smooth is that which with the aequality of its parts doth pleaſantly affect the touch: rough is that which with the inequality of its parts doth diſtract and draw aſunder the touch.*

Note, in liquid things, the ſmooth is called mild, the rough tart; ſo marble unpoliſhed is rough; poliſhed it is ſmooth. Water is rough, oile is mild; a vehement and cold wind is rough and ſharp; a warm air is mild. So in our body, humours, vapours, ſpirits, are ſaid to be mild or ſharp.

XVIII *Lightneſſe is the haſting upwards of a body by reaſon of its rarity and ſpirituoſity: heavineſſe is the proneneſſe of a denſe body downwards: as that appears in flame, and every exhalation, this in water and earth.*

N.W.

N. W. 1 how this motion is made upwards and downwards by a love of fellowship, or of things of the same nature, hath been said *cap.* 3.

2 The inæquality of heavinesse or ponderosity, is from the unequall condensation of the matter. For look, how much the more matter there is in a body, so much the more ponderous it is: as a stone more then wood, metals more then stones, and amongst these gold, quicksilver and lead most of al, because they are the most compacted bodies.

3 Amongst all heavy things, gold is found to be of greatest weight: spirit of wine, or sublimated wine of least. and the proportion of quantity betwixt these two, is found not to exceed the proportion of 21 parts: so that one drop of gold is not heavier than one and twenty drops of spirit of wine.

XIX *Heat is a motion of the most minute parts of the matter reverberated against it self, penetrating and rending the touch like a thousand sharp points: but cold is a motion of the parts contracting themselves.*

N. W. 1 It appears that heat and cold, are motions and fixed qualities: 1 because there is no body found amongst us perpetu-

ally

ally hot or cold, as there is rare and denſe, moiſt and drie, &c. but as a thing heats or cools; the which is done by motion. 2 becauſe ſenſe it ſelf teſtifies, that in ſcorching the skin and members are penetrated and drawn aſunder, but in cold they are ſtopped and bound, therefore it is a motion. 3 becauſe whatſoever is often heated, (though it be metall) is diminiſhed both in bigneſſe and in weight, till it be even conſumed, and whēce is that, but that the heat caſting forth a thouſand atomes doth weare and conſume away the matter?

Now it is called a motion of parts, and that reverberated againſt it ſelf: for that which is moved in whole, and directly (not reflexedly) doth not heat; as wind, a bird flying, &c. but that which is moved with reverberation, or a quick alteration, as it is is in the repercuſſion of light; in the iterated colliſion of bodies, in rubbing together friction, &c.

3 But we muſt diſtinguiſh betwixt *Calidum*, *Calefactivum*, and *Calefactile*, *Calidum* or *Calefactum*, is that which is actually hot, and ſcorcheth the touch, as flame, red hot iron, ſeething water, or air (which alſo receiveth amoſt violent heat,) &c.

N.

N. W. among all things that are known to us, fire is *moſt hot*; wee have nothing that is *moſt cold* but ice; which notwithſtanding is farre off from being oppoſed in its degree of cold to the degree of heat in fire.

Calefactivum is that which may ſtirre up heat; as motion, and whatſoever may procure motion; namely fire; and pepper, and all ſharp and bitter things, taken within the body: for motion is from fire, and fire from motion, and heat from them both. For as fire cannot but be moved (elſe it preſently goes out,) ſo motion cannot but take fire; as it appears by ſtriking a flint, and rubbing wood ſomething long. Therefore both are calefactive, but fire is further ſaid to be actually hot, calefactive things are commonly called *hot in potentiâ*.

Calefactile is that which may eaſily be heated as air, and after air fat things (oile, butter,) then wood, then water. For in theſe becauſe the parts are ſomewhat rare, they are the more eaſily moved to agitation. ſtones and metals becauſe they have their matter compacted, do not eaſily admit of heat; but retain it the longer after it is admitted, becauſe it cannot eaſily exhale by reaſon of the ſtraight pores. and this is the

cauſe

cauſe, why all things conſiſting of ſmall particles, as feathers, hairy skins, and all rough things, (yea, and all ſorts of duſt) do either alwayes retein heat, (by a certain agitation of the aire incloſed) or at leaſt eaſily receive it, by ſome tranſpiration raiſed only from a living body.

4 We muſt alſo note, that all theſe tactile qualities, may be ſaid of the ſame body in a diverſe manner; namely, in reſpect of another body, as water in reſpect of air, is a denſe and heavy body; in reſpect of earth, or a ſtone, rare and light; yea and by reaſon of the touch thus and thus diſpoſed, it ſeems to be on this, or that manner; for example, warm water ſeems cold to a hot hand, hot to a cold hand.

5 The diverſe effects of heat, are to be conſidered alſo according to the diverſity of the object.

The

The perpetuall effect of heat is attenuatiō: but after different manners in a matter that is

Liquid

Sulphury, which it kindleth, turnes to flame, and snatcheth upward.

Mercuriall, which it rarifies, and stretcheth forth, as may be seen in the evaporation of water: also in the desiccation or drying up of earth, wood, &c. in which all the humour & moisture that is, turnes and evaporates into air.

Consistent which if it have parts that are

Glutinous & Sulphury, it forces them to melt, as may be seen in suet, wax, metals.

Ashy or salt, it forces them to be condensed, by the drying up of the moisture: and also to break if you force them the more; as wood, a clot, a tile, &c. (and so hardning is an effect of heat by accident.)

Of

Of tasts.

XX *The gustatile quality is called savour & taste; which is a tempering of the first qualities by heat and cold.*

Temperate { Sulphur { *Sweetnesse.*
Aduſt. { giveth { *Bitternesse.*

For { Salt { Of its own nature. { Combuſt. { giveth { *Softnesse.* / *Sharpnesse.* / *Somernesse.* / *Bitternesse.* / *& Austerity.*
Indifferently cooled.
Extreamly cooled.

For the Mordaity of all these, argues Salt.

It appears therefore, whence herbs, fruits, parts of living creatures, and minerals have their savours; namely, from *salt* and *sulphur*, diffused every where, whereof every creature sucketh in more or lesse according to its nature. Mercury is of it selfe without taste; (as we note in flegme) but the others are soaked thereby, as also by the severall degrees of cold or heat, so that they are more or lesse sweet, bitter, salt, &c.

Of smels.

XXI *The olfactile quality is called odour; which is a most thin exhalation of the taste.*

Yet sulphury things yield more smell then salt things; and hot things more then others; because heat attenuates, and spreads into the air. Hence gardens and ointment boxes, are so much the sweeter, by how much the hotter the air is; yet by how much the sweeter they are, so much the sooner they lose their smell, that odiferous sulphureous quality being exhaled by little and little.

Of sounds.

XXII *The audible quality is called sound; which is a cleaving of the air sharply stricken, flowing every way.*

Every motion of the air doth not give sound, but that motion whereby the air is sudden-

ſuddenly divided and parted. Now a ſound is either acute or obtuſe; pleaſing or diſpleaſing; according as the body, that ſmiteth the air, is acute or obtuſe, ſmooth or rough.

The naturall kinds of ſound are: *tinkling*, when the air blows through ſome ſharp thing. *Murmur* of running water: *ratling* of thunder: *ruſtling* of leaves: *bellowing* or *lowing* of Oxen: *roaring* of lions; *hiſſing* of ſerpents: and the voices of other living creatures.

Of colours.

XXIII *The viſible qualitie is called colour; which is light diverſly received in the ſuperficies of bodies, and tempered with the oppoſite darkneſſe, as whitenſſe, blackneſſe, greenneſſe, &c.*

Obſer. 1. That colour is nothing in it ſelf, but light diverſly reflected from things, appears; 1 becauſe as it is not ſeen without light, ſo it is not found to be any thing by any other ſenſe, or by reaſon: neither is it therefore. 2 becauſe colours as well as light diffuſe themſelves through the aire, and are in the eyes of all beholders. Now we ſaw before, that the diffuſive motion was proper to the light, therefore colour is in-

deed nothing, but light diverſly tinct with the diverſe ſuperficies of things. 3 becauſe light being reflected after ſeverall manners in the ſame matter, produceth ſeverall colours. We ſee that, for example ſake, in a cloud, which is in it ſelf like it ſelf, yet it appears to us ſometimes whitiſh, ſometimes blackiſh, ſometimes ruddy, according as it is oppoſed to the light. In like manner we ſee in the Rainbow (which is nothing elſe but the reſolution of a cloud into moſt ſmall drops of water) yellow, green, flame and sky-colour, as it appears alſo in Chryſtall duſt turned towards the light; which ſhew plainly, that *colour* is nothing elſe but a different tincture of light from the different incidencie thereof. But there (in the Rainbow and glaſſe) the colours paſſe through; becauſe the matter it ſelfe is fluid and tranſparent: in fixed bodies, colours are alſo fixed; but after a way known to God, rather then to us.

Obſer, 2. That from the receptibility of colours, a body is called *Pellucid*, or *Opacous*. *Pellucid* (Tranſparent and Diaphanous) is that which gives the light a paſſage through it, and is therefore neither coloured nor ſeen, as air: and in part water, glaſſe,

glaſſe, chryſtall, a diamond, &c. (that air is not coloured, that is tinct with light, appears in a room cloſe ſhut up on every ſide, if you let in a beam of the ſun at a hole, for that will paſſe through the whole room, and yet will appear no where, but on the oppoſite wall or pavement: or unleſſe you interpoſe your hand or ſome other denſe thing: or the duſt be raiſed, and the atomes of it flie in that quantity as to reflect the light.) *Opacous* is that which doth not give the light a paſſage, but reflects it, and therefore it is coloured and ſeen: as earth, wood, a ſtone, gemme, and waters coloured: and *this light reflected from an Opacous body, is properly called colour:* of which there are ſix kinds, *white, yellow, green, red, skie-colour, black.*

White, is light reflected with its own proper face.

Yellow is light tinct with a little darkneſſe.

Green, is light in a middle, and moſt pleaſing temperature of light and darkneſſe.

Red, is light more inclining to darkneſſe.

Skie-colour, is light more then halfe dark.

Black, laſt of all, is the non-repercuſſion

of the light, by reason of a dark superficies.

Every of these colours hath under it diverse degrees and species, according to the various temperature thereof with the others; which we leave to the speculation of *Opticks* and *Painters*.

XXIV *There remains a quality which is perceived by two senses, touch and sight, namely* FIGURE; *whereby one body is round, another long, another square, &c. but the consideration of this is resigned to the Mathematicks.* *Of an occult quality.*

XXV *An occult quality is a force of operating upon any other body, which notwithstanding is not discovered, but by its effect.*

For examp. that the *loadstone* draws iron: that poisons assaile, and go about to extinguish nothing but the spirit in bodies: that *antidotes* again resist poison, and fortifie the spirit against them; that some herbs are *peculiarly* good for the brain, others for the heart, others for the liver, and such like. Such kind of occult qualities as these God hath dispersed throughout all nature, and they yet lie hid for the better part of them, but they come immediately from the peculiar spirit infused into every creature. For even as one and the same matter of the world,

world, by reaſon of its diverſe texture, hath gotten as it were infinite figures in ſtones, metals, plants, and living creatures; ſo one and the ſame ſpirit of the world, is drawn out as it were into infinite formes, by various and ſpeciall virtues, known to God, and from theſe occult qualities ſympathies and antipathies of things do properly ariſe.

CHAP. V.

Of the mutations of things, generation, corruption, &c.

FRom the contrarieties of the qualities, eſpecially of cold and heat, (for theſe two qualities are moſt active) thoſe mutations have their riſe, to which all things in the world are ſubject: which we ſhall now ſee.

I *Mutation is an accident of a body, whereby its eſſence is changed.*

Namely, whither a thing paſſe from not being to being; or from being to not being; or from being thus to being otherwiſe.

II *All bodies are liable to mutations.*

The reason, because they are all compounded of matter, spirit and fire: which three are variously mixed among themselves perpetually. For both the matter is a fluid and a slipperie thing, and the spirit restlesse, always agitating it self; and (heat raised every where by light and motion) doth eat into, rent, and pluck asunder the matter of things. From thence it is, I say, that nothing can long be permanent in the same state. All things grow up, increase, decrease, and perish again. Hence also the Scriptures affirm, that the heavens wax old, as doth a garment, *Psal.* 102. *v.* 27.

III *The mutation of a thing, is either essentiall or accidentall.*

IV *Essentiall mutation, is when a thing begins to be or ceases to be: the first is called generation, the other corruption.*

For example; snow, when it is formed of water, is said to be generated, when it is resolved again into water, to be corrupted.

V *An accidentall mutation of a thing is, when it increases or decreases, or is changed in its qualities: the first is called augmentation, the next diminution, the last alteration (which we are now to view severally how they are done)*

Of

Of the generation of things.

VI *Generation is the production of a thing, so that what was not, begins to be.*

Thus every year, yea every day infinite things are generated through all nature.

VII *To generation, three things are required, Seed, a Matrix, and Moderate Heat.*

These three things are necessary in the generation of living creatures, plants, metals, stones, and lastly of meteors, as shall be seen in their place.

VIII *Seed is a small portion of the matter, having the spirit of life included in it.*

For seed is corporall and visible; therefore materiate, and it is no seed, except it contein in it the spirit of the species, whose seed it should be: For what should it be formed by? therefore seeds out of which the spirit is exhaled, are unprofitable to generation.

IX *The Matrix is a convenient place to lay the seed, that it may put forth its vertue.*

Nothing is without a place, neither is any thing generated without a convenient place; because the actions of nature are hindred. Now that place is convenient for generation, which affordeth the seed. 1 a soft site. 2 circumclusion, least the spirit should evaporate

porate out of the seed being attenuated. 3 veins of matter to flow from elsewhere. *N. W.* And there are as many matrixes or laps, as there are generations, the *aire* is the matrix of meteors; the *earth* of stones, metals, and plants; the *womb* of living creatures.

X *Heat is a motion raised in the seed, which attenuating its matter, makes it able to spread it self by swelling. For the spirit being stirred up by that occasion agitateth it self, and as it were blowing asunder the attenuated parts of the matter, disposeth them to the forme of its nature.*

This is the perpetual processe of all generation, and none other. From whence hereafter (under the doctrine of minerals, living creatures, plants) many things will appear plainly of their own accord. yet we must observe that some things grow without seed, as grasse out of the earth, and worms out of slime, wood, and flesh putrified: yet that is done by the vertue of the spirit diffused through things; which whersoever it findeth fit matter, as a matrix, and is assisted by heat, presently it attempts some new generation, (as it were the constitution of a new Kingdom). But without heat (whither it

it be of the sunne, or of fire, or the inward heatof a living creature it matters not, so it be temperate) there can be no generation, because the matter cannot be prepared, softned, or dilated, without heat.

Of the augmentation of things.

XI *Everything that is generated, increaseth and augmenteth it self, as much as may be: and that by attraction of matter, and assimilation of it to it self.*

For whereſoever there is generation, there is heat: and where there is heat, there is fire; and where there is fire, there is need and attraction of fewell. For heat, becauſe it always attenuateth the parts of the matter which exhale, ſeeks and attracts others wherewith it may ſuſtein it ſelf: (as we ſee it in a burning candle) and a portion of matter beiug attracted and applyed to a body, taketh its form by little and little, and becomes like unto it, and is made the ſame. For by the force of heat, of heterogeneous, things become homogeneous: the ſpirit of that body, in the mean time, attracting alſo to it ſelf ſomewhat of the ſpirit of the univerſe, and ſo multiplying it ſelf alſo. So ſtones minerals, plants, living creatures, &c. grow.

Of

Of diminution

XII *Whatsoever hath increased, doth at some time or other cease to increase, and begin to decrease and that for and through the arefaction of the matter.*

Namely, for because the heat increased with the body, increasing, doth by little and little and little consume the thin and fat parts thereof, and dry up the solid parts, so that at last, they are not able to give assimulation to the matter flowing in, and that for want of gluten, and therefore the body fadeth, and withereth and at length perisheth.

Of the alteration of things.

XIII *No body doth always retein the same qualities, but changeth them variously.*

For example, wood when it grows, is thin and soft, afterward it is condensed & hardned, especially being dried: fruit on the contrary, as it ripens grows rare and soft, changing its colour, savour and smell. For it is the law of the universe to be subject to vicissitudes: as also to corruption, of which it here follows.

Of the corruption of things.

XIV *Every body is liable to corruption.*

Because compounded of a decaying matter,

ter, and an agitable spirit; which may be disposed according to the mutation of the heat. Therefore seing that alterations cannot be hindred, neither can perishing. And hence perhaps every materiall thing is called *CORPUS*, as it were *corrupus*, because it is subject to corruption.

XV *All corruption is done, either by arefaction or putrefaction.*

For we speak not here of violent corruption, which is done by the solution of some continued thing, (as when any thing is broken, rent, bruised, burnt, &c.) but of naturall corruption, which brings destruction to things from within, it it is manifest that this can be done no way, but by arefaction or putrefaction.

XVI *Arefaction is when afflux of matter is denied to a body, and the heat included, having consumed its proper humour, dries and hardens the rest of the parts, and at length forsakes them.*

So Hearbs, Trees and living creatures, &c. wither.

XVII *Putrefaction is when the spirit is exhaled from a body, and the parts of the matter are dissolved, and return into their heterogeneous parts.*

For

For then the watery parts are gathered to themselves (therefore putrefied things give an evill sent) the oily parts to themselves, whence putrefied things have always some unctuosity) the dregs to themselves (whence that confusion in putrified things and unpleasant tast, &c.) and hence it is easie to finde the reason, *why cold, salt and drying hinder putrefaction?* namely, because cold stops the pores of a body, that the spirituall parts cannot go out and exhale: but dryed things are exhausted of those thin parts, which might be putrefied: salt last of all bindeth the parts of the matter within, and as it were holds them with bands, that they cannot escape, & let forth the spirit. Again, it may easily be gathered from hence, *why hard and oily things are durable?* namely, because hard things have much salt, which hindereth putrefaction; but they are destitute of humidity (the provocation of putrefaction.) And oily things, because they do not easily let go their spirit, by reason of their well nourishing and gentle usage of it: (*suet* and *fat* putrifie, because they have loose pores, and some aquosity.)

N. W. We must nevertheless observe, that not onely soft things (herbs, fruits, flesh)

fleſh) putrifie, but alſo the hardeſt bodies, namely, ſtones and metals. For the ruſt of theſe is nothing elſe but the rottenneſſe of the inward parts, ſpreading it ſelf abroad through the pores,

XVIII *Out of that which hath been ſaid, it may be gathered, that the world is eternall potentially.*

For ſeing that not any one crum of matter can periſh, nor the ſpirit be ſuffocated, nor the light be extinguiſhed, nor any of them fly forth out of the world, and muſt of neceſſity be together, and paſſe through one another mutually, and act upon one another, it is impoſſible but that one thing ſhould be born of another, even without end. For that old *Axieme* of Philoſophers is moſt true; *the corruption of one is the generation of another.* the *Architect* of the World in that manner expreſſing his æternity.

CHAP.

CHAP. VI.

Of the Elements; Skie, Air, Water, Earth.

WE have hitherto contemplated the generall parts of the world, namely, the *principles* with the common *accidents* thereof: now follow the ſpecies of things, which are derived from the ſaid principles by divers degrees. Where firſt elements come to be conſidered, as which being framed of the firſt congreſſe of the principles, are as it were the baſes and hinges, of the whole order of the world.

I *An element is the firſt and greateſt body in the world of a ſimple nature.*

A body, or *a ſubſtance*, for though we called matter, ſpirit, and light ſubſtances alſo, (*cap.* 2.) becauſe they are not accidents; yet becauſe none of them exiſteth of it ſelf, and apart, but do joyntly make up other ſubſtances, the elements and the creatures that follow may with better right be ſo called. Now an element is ſaid to be of a ſimple nature, in reſpect of the ſubſtances,

ſtances following, which have compound natures, as it ſhall appear.

II *The conſtitution of the elements is made by light.*

For light being ſent into the world, by its motion and heat began to rouſe up the Chaos of the matter of the world; and when it turned it ſelfe round, (as yet it turnes) it purified part of the matter, and made it more ſubtile, the reſt of the matter of neceſſity ſetling and gathering it ſelfe into denſity elſewhere.

III *There are foure Elements, Skie, Air, Water, Earth.*

That is, there are four faces of the matter of the world reduced into formes, (for at the firſt it was without form) differing eſpecially in the degree of rarity and denſity. Note. *The Peripateticks put the ſublunary fire, for skie, and call the skie a Quinteſſence.* But that ſame ſublunary fire is a meer figment; the heaven it ſelfe, furniſhed with fiery light, is the higheſt element of the world; as after the Scripture the ſenſes themſelves demonſtrate. He that is not ſatisfied with theſe of ours, but ſeeks more ſubtile demonſtrations, let him ſee *Campanella*, *Verulamius*, and *Thomas Lydiat* of the nature

ture of heaven,&c. and he will acknowledge the vanity of this Aristotelicall figment.

IV *The skie is the most pure part of the matter of the world, spread over the highest spaces of the world.*

It is vulgarly called the visible and starry heaven, and by an errour of the Greeks (who, thinking that it was of a solid substance, like Chrystal, called it στερέωμα) the Firmament: but little agreeably to the truth. More conveniently οὐρανὸς from the Hebrew אוֹר & אוּר that is, light and fire, *quasi* ὑπ' ἄνω (that is fire above) and so *from burning*: as αἰθὴρ is derived of αἴθω to burn. For it burneth with an inextinguable light of the stars, whereby it is also purified. The notation of the Hebrew word favours this, שָׁמַיִם of אֵשׁ and מַיִם fire and water. The nature of the heaven is to be *liquid in the highest degree volatile and hot.*

V *Air is a part of the matter indifferently pure, spread over the lower spaces of the world.*

The nature of it is to be *breathable* and *passable* every way.

VI *Water is a grosser part of the matter of the world reduced into fluidity.*

The nature of it is to be *fluid* and *moistning.*

VII *The*

VII *The earth is the moſt groſſe part of the matter, as it were the dregs and ſetling gathered together at the bottom.*

The nature of it is to be *dry* and *immoveable.*

VIII *The elements therefore are all one matter of the world, diſtinguiſhed by degrees of denſity and rarity.*

For where the light is wheeled about, there the matter is moſt rarefied and pure: below that more groſſe, then groſſe and fluid, at length in the bottome dregs and a thick ſetling. Therefore this is a meer gradation. For earth is nothing elſe but thickned and hardned water: water, nothing but thickned air: air, ſubtilized water: water, liquified earth.

Butf rom this difference of denſity & rarity there ariſeth another *difference* of the ſame elements, namely, *in regard of motion and reſt, heat and cold.* The water is moveable. (For it flows) the air more yet (for it transfuſeth it ſelf here and there;) the skie doth nothing but whirle about moſt ſwiftly, & that perpetually. Alſo the heaven by reaſon of its perpetuall motion is hot, (yea burneth) perpetually; the earth by reaſon of its perpetual reſt is cold perpetually: except where it is warmed by the fire of heaven coming upon it, or incloſed in it.

IX *The elements are transmutable into one another.*

That is, becauſe the heat raiſed in the matter may extend and condenſe it. In the water and air we ſee that come daily to paſſe. For who knoweth not, that water doth evaporate, and is turned into air? that water is made again of vapour, the rain teacheth us. But we may alſo procure the ſame mutation in our hand: or in vulgar Alembicks in which waters or wines are diſtilled. Let theie be an Alembicks void of all matter, filled onely with air. To the long pipe of this that hangeth out apply ſome narrow mouthed glaſſe, and ſtop the pipes mouth carefully, that no air may any way get forth: you ſhall ſee that when it cannot dilate it ſelfe locally, it will be coagulated into water in the utmoſt and coldeſt corner of it; (that is in the glaſſe.) You ſhall ſee (I ſay) that glaſſe ſweat and diſtill drops, into which the air heated and rarified in the Alembick contracted it ſelfe. But remove away the fire, you ſhall ſee thoſe drops vaniſh by little and little, and return into air.

X *Ariſtotle thought that the Elements were in a tenfold proportion to one another; but*

but later men have found them near an hundredfold

That is, that of one drop of earth is made by rarifaction ten drops of water; and of one of water ten of air. The truth of the latter assertion is easie to be demonstrated, thus. Let one take a bladder (of an oxe or an hog) and having cleansed it, anoint it with oile to stop the pores, that the air may not get out. To the neck of this (but having first crushed out all the air) let him tie the neck of some little glasse, with about an hundreth part of the water which the bladder might contein. Let this instrument be set in the hot sun, or in a very hot stove, where the water is by the heat turned into air, it will appear that the bladder will be full But bring the same bladder swelled with air into the cold, you shall see it (the vapour turning again into water) fall again. *Note.* The same hundreth proportion, or near upon, is also observed among colours, for one drop of ink or red will colour an hundred drops of water, not on the contrary; and that because blackness represents the earth in density; whiteness the heaven in rarity. But this very proportion varies, because the air is in

it selfe somtimes thicker and grosser, somtimes more rare and thin.

XI *The matter of all the elements, as it is made up of Atomes, so it is turned again into Atomes: by so much the more subtlely as it is the more subtle in its masse.*

For example, the earth and every dry and hard thing, is brought into a dust almost indivisible, which may be sifted through a sieve, but cannot penetrate. The water may both be strained and penetrate. For example, through vessels of earth and wood, yea, and of lead as *chap.* 4. *aphorisme* 13. we have set down an example. Air and fire penetrate also through thicker bodies: as heat through furnaces.

XII *The elements are the four greatest bodies of the world, of which others are generated.*

That the lesser bodies of the world, which are infinite in number, and in forms, are really compounded of the elements, resolution shewes. For when they are corrupted, they return into the elements. And sense teacheth. For all things have some grossenesse, from the earth; some liquour from the water; some spirituosity from the air: some heat from heaven; and because all

all things that live, are nouriſhed by theſe, they are thence called *Elementa quaſi Alimenta*, as if you ſhould ſay nouriſhment, as in *Bohemian* ʒiwel or ʒiwenj.

XIII *The Elementary matter occupies a place in the world according to its degree of denſity and rarity.*

For the earth reſteth at the bottome: the water ſwims upon that: the air fleets above the water: and laſtly the skie is in the higheſt place: you ſhall ſee the like ſpectacle if you pour clay, water, wine, (eſpecially ſublimated) and oile into a glaſſe: for every one of theſe, will occupie a place according to its nature.

XIV *Therefore the Elements make the four viſible regions or ſphears of the world.*

For the earth is a globe; which the water naturally encompaſſeth round; the air it: the skie the air: after the ſame manner as in an egge the yelk is encompaſſed with the white; and that with the skin and ſhell.

XV *Of the Elements there are two extreams, the skie and earth; as many mean, air and water.*

They are called extream aad mean both in regard of their ſites, and of their acci-

dents. For the skie is in the higheſt place, moſt thin and hot: the earth in the loweſt, moſt thick and cold: Skie the firſt moveable; earth the firſt reſting. The air and water as they partake of the extreams, ſo of their accidents: being ſomtimes either leſſe thick or thin, moving or ſtill, hot or cold.

XVI *But becauſe the Elements were prepared not for an idle ſpectacle, but for ſtrong operation upon one another; the Creatour did ſomewhat change that order, and commanded two ſorts of water to be made, and two ſorts of fire.*

XVII *For part of the water is placed above the higheſt part of the skie: and on the contrary, part of the fire is taken from the skie, and ſhut up into the bowels of the earth.*

Both theſe may ſeem paradoxes: and therefore need demonſtration. And as touching the waters it is manifeſt by the teſtimony of *Moſes*, *That God made* (the ſecond day) *the* Expanſum *of the heaven, which might divide betwixt the waters which are under the* Expanſum, *& the waters above the* Expanſum, *Gen.* 1. 6,7,8. What can be more clear? now whereas ſome modern Divines interpret it of the waters of the clouds, that is too cold. They ſay that *Jer.* 10. 13. The rain waters

are

are signified by the name of the water in heaven; and therefore here also. But I answer. 1 That the *waters in heaven* are one thing, and the *waters above heaven* another: Rain might be called *water in heaven*: because the air was by the Hebrews called the first heaven: but it cannot be called the *waters above heaven*, as these of which *Moses* speaks. 2 That the waters of the clouds are not waters in act, but vapours: but *Moses* speaks of waters For he sayes expressly, *that in the first seven dayes there was no rain.* (*cap.* . *ver.* 5.) but he sayes that those waters above the *Expansum* were presently made the second day; therefore they are some thing else then rain water. 3 He sayes, that the waters were seperated from the waters, but the waters of the clouds are not separated from the waters of the sea, and of rivers For they are perpetually mingled: vapours ascending, rain descending. 4 He sayes, that the *Expansum* was in the middest betwixt the waters and the waters: but how can that be said of the clouds, which are below the *Expansum*, and reach not to the thousandth part of its altitude? Lastly, *Psalm* 148 placeth the waters above the heaven, next of all to the Heaven

of Heavens, *v.*4. but reckons up clouds and rain afterwards, among the creatures of the earth, *ver.* 8. what need we any other interpretation?

Reason perswades the same thing most strongly. For setting down the principles of the world in that order, wherein we see them set down by *Moses*; it was necessary, that the matter being scattered by the light rolling about; should flie hither and thither, and coagulate it selfe at the terms of the world on both sides, that in the middle where the light went, (and goes yet) there should be pure skie; but that on both sides above and below, the mat hardning it self, should grow thick. We see it done here below: why not above also? especially God himself intimating it. Let it be so, because naturally it cannot be otherwise.

But that there is fire included in the earth 1 the eructations of fire in *Ætna, Vesuvius, Hecla, &c.* do shew. 2 the springs of hot waters every where, 3 the progeneration of metals, even in cold countreys: and other things which can come from nothing else but from fire, which shall be looked into in that which follows. 4 lastly there is a testimony extant in the book of *Job chap.* 28. *v.*5.

28.v.5. *Bread commeth out of the earth, and under it is turned up as it were fire.* Let the Reader see *Thomas Lydiats* disquisition concerning the originall of Fountains, and there he shall see it disputed at large, and very soundly.

XVIII *The waters above the heaven are there placed for ends known to God, but the use of fire under ground, is well enough known to us also.*

Yet we may say something of these waters by conjecture. As namely, that it was meet, that there should be visible termes of the visible World: and that the heat of the frame ever rolling, had need of cooling on the other side also: and the like. But that of the fire under ground, mountains and valleys, and caves of the earth are produced, and also stones, metals, and juyces generated, and many other things we shall see in that which follows: for without heat, there is no generation, because there is no motion.

Of the Skie in specie.

XIX *The Skie is the highest Region of the most vast world, the dwelling place of the stars.*

XX *The Skie is the most liquid part of the whole world, and therefore transparent, and most moveable.*

For

For by the motion and heat of the Sun always present, it is perpetually attenuated to an exceeding subtlety.

XXI *The whole skie is moved about, because that burning and ever flying light of the stars, hurries it about with it.*

That appears, 1 by reason: for if the starres were moved in the heaven immoveable (after that manner that birds are carried in the air, and fishes in the water) that penetration of the heaven would not be without violence; neither could it be performed with so great celerity, nor with so æquable a course, by reason of the resistance. Therefore the starres are carried in heaven in all respects, as clouds in the air, that is, with their charriot. 2 by sense, for we see that our fire carries away with it the matter which it hath caught and attenuated, namely, vapours, smoaks, flames: why not the heavenly fire also? which comets also shew to the eye, of which we shall see more *chap.* 8. 3. The same is to be gathered out of *Moses* words accurately considered. (*Gen.* 1. *v.* 14. & 17.

Of the air.

XXII *The air is the lowest Region of the* Expansum, *the abode of the clouds and birds.*

In

In Scripture, it is signified by the name of the first heaven. Yet it penetrates water and earth, to fill up their cavities because there is no *vacuum*.

XXIII *The air is of a middle nature betwixt the heaven and the water, in respect of site and qualities.*

Yet it is thicker where it joyns to the earth and water; and thinner towards heaven. Therefore in the highest tops of some mountains, neither men can live, nor trees grow, because of the thinnesse of the air, by reason of which it is neither sufficient for the breathing of living creatures, nor for the growth of plants.

XXIV *The air neer the earth in summer is hot,* (by the vehement repercussion of the Suns verticall beams:) *in winter,* (by reason of the obliquity and obtuse reflexion of the beams) *it cannot be heated: above it is always cold, yet most in summer, when it is pend in on both sides with the heat of the heaven, and of the earth.*

Of the water.

XXV *Water is thickned air. Washing and and moistning the earth; the abode of fishes.*

XXVI *Water of its own nature is onely moist and fluid: to the rest of the qualities indifferent.*

Ob-

Obſ. 1. The fluidity of the water is ſuch, that if you give it never ſo little declivity, it runs. But the humidity is unequall according to the degree of rarity and denſity. For a ſhip ſinks not ſo deep in the ſea, as in a river: becauſe the ſea water is thicker and drier.

Obſ. 2 They adde commonly, that water is naturally cold, by a twofold argument 1 becauſe it cooleth. 2 becauſe it extinguiſheth fire, but I anſwer it cools not by its coolneſſe, but by its crudity. But it quencheth fire after the ſame manner, as hot water and wine, do, though they be hot, not becauſe they are contrary to fire, but becauſe fire is nouriſhed with the thinner parts of the wood, but if abundance of water be caſt on (or any fluid thing, even oyl) the pores are ſtopped, and the fire is quenched. Otherwiſe fires are made of *Bitumen*, (which is not a porous matter) that burn in the very water, which we ſee done alſo in lime. Laſtly, great fires are nouriſhed with water. We ſee alſo that there is ſometime hot, ſometime cold water, not onely in rivers, but alſo breaking out of fountains, according as it is affected; yet it may not be diſſembled in the mean time, that air is more

prone

prone to heat, by reaſon of its rarity; water to coldneſſe by reaſon of its thickneſſe.

XXVII *The water at firſt covered the earth round about; but (on the third day of the creation, it was gathered into certain channels, (which are called Seas, Lakes, Pooles, Rivers, &c.)*

That this was done at the command of of God. *Moſes* teſtifies in theſe words. Let the waters be gathered together into one place, that the dry land may appear *Gen.* 1. *v.* 9. but *David* (relating the proceſſe of the creation) deſcribes the manner alſo. *Pſ.* 104 *v* 6,7,8,9. *That thunders were raiſed, by which the Mountains aſcended, the valleys deſcended, but the waters were carried ſteep down into their chaunels: and that in this ſort, a bound was ſet them, that they might not return to cover the earth.* Whence it is very likely, that that diſcovery of the ſurface of the earth, was made by an earthquake: but that the earthquake was produced by the fire ſunk into the earth; which giving battle to the cold there conglobated, ſhook the earth, and either cauſed it to ſwell variouſly, or rent it aſunder. Whence thoſe riſings and fallings in the ſurface of the earth (that is mountains and valleys) were made: but within

within caves and many hollow places. This done, the waters of their own accord betook themselves, from those swelling eminencies to the low and hollow places. This pious conjecture will stand so long, as no more probable sense can be given of this Scripture. And what need many words? common sense testifies, that mountains are certainly elevated, valleys and plains depressed. therefore of necessity that was sometime so ordered; but not in the first foundation of the earth the second day; for then the grosser parts of the matter flowing about poised themselves equally about the center, therefore it was about the third day, when the face of the earth appeared, and the waters flowed into their channels. But besides perhaps God doth therefore permit earthquakes yet to be sometimes, and by them mountatains and valleys and rivers to be changed, that we may not be without a pattern, how it was done at the first.

XXVIII *The water then is divided into Seas, Lakes, Rivers and Fountains.*

XXIX *The sea is an universall receptacle of waters, into which all the rivers of the earth unburthen themselves.*

Which very thing is an argument that the

the sea is lower then the earth : for rivers run down, not up again.

XXX *The sea is one in it self; because it insinuates it self into the Continent here and there, as it were with strong arms, it hath gotten severall names in severall places.*

That great Sea encompassing the earth is called the Ocean, those armes dividing the Continent, Bayes, or Gulfs. For all those gulfes are joyned to the Ocean, except the *Caspian* or *Hyrcanian Sea* in *Asia*: yet that is thought to have channells within the earth, whereby it joyned to the Ocean.

XXXI *The Sea is of unequall depth commonly from an hundred, to a thousand paces: yet in some places they say, that the bottome cannot be found Hence the sea is called an Abysse.*

It is probable that the superficies of the earth covered with the water, is as unequal as this of ours standing out of the water, namely, that in some places are most spacious plaines, in other places valleys and depths, and in other places mountains and hils, which if they stand above the water are called Ilands, but if they be hidden under the water shelves.

XXXII *The water of the Ocean faileth not, be-*

because huge rivers and showres continually flow into it; neither doth it, overflow because it doth always evaporrte upwards in so many parts of it.

Of the earth.

XXXIII *The earth is the most dense body of the world, as it were the dregs and setling of the whole matter.*

And therefore grosse, opacous, cold, heavy.

XXXIV *It hangeth in the middle of the universe, encompassed with air on every side.*

For being that it is on every side encompassed with the heaven, and is forced by the heat thereof on every side, it hath not whither to go, or where to rest, but in the *æquilibrium* of the universe.

XXXV *The earth is every way round.*

For the forme which at the first it received from the light of heaven wheeling about it, it yet retaineth: except that in some places it is elevated into mountains and hils, by the thunder which was sent into its bowels the third day, in other places again it is pressed down into valleys and plains, for the running down of the rivers: but that doth not notably hinder the globosity thereof.

XXXVI *The better part of the superficies of the earth is yet covered with water: the lesser*

leſſer part ſtands out of the water, where it is called dry land, or continent: or if it be a ſmall portion, an Iſland.

There are ſeven Continents of the earth; *Europe*, *Aſia*, *Africa*, *America Peruviana*, *America Mexicana*, *Magellanica*, (or *Terra Auſtralis*) and *Terra Borealis*: but there are Iſlands innumerable.

XXXVII *The earth is in its outward face in ſome places plain, in others mountainous: but within in ſome places ſolid; in others hollow.*

That appears in Mountains and Mines of metal, where is to be ſeen here ſtones or clay very cloſe compact, there dens and moſt deep caves, and endleſſe paſſages, which muſt needs be thought to have been the work of the thunder, ſent into the earth the third day of the creation, (which penetrating and piercing its bowels ſo tore them.) Now there are in the earth not only ſpacious caves and holes, but an infinite number of ſtraighter veins, and as it were pores, which is plain enough by experience.

XXXVIII The cavities of the earth are full of water, air, fire.

For being that there are cavernes, paſſages and pores, they muſt needs be filled;

and that with a thin matter. Of air no man will doubt. But that there are waters in the cavernes under ground, appeares in the mines of mettall; and is proved by the testimony of the Scripture, which in the history of the deluge, saith that all the fountains of the great deep were broken up; (*Gen.* 7. *v.* 11.) Lastly, that there is fire under the earth, we have already seen Aphorism 16. which it is credible, is the relicks of the lightning raised within the bowels of the earth the third day of the Creation, (*Psalm.* 104. *v.* 7.) left there for the working of minerals; but nourished with sulphureous and bituminous matter, spread through the bowels of the earth.

CHAP. VII.

Of Vapours.

IF the Light of Heaven had wrought nothing else upon the matter, but melt it together into the formes of the Elements, as it was variously rarified or densified, the world had remained void of other living creatures. But it ceaseth not passing through the Elements themselves to scorch

ſcorch them, and ſcorching them to attenuate them, and attenuating them, to reſolve them into *vapours*: of which condenſed again, many ſeverall ſpecies of things are progenerated. Now then the nature of vapours ſhall be laid open in the following Aphoriſmes.

I *Vapour is an Element rarified, mixed with another Element.*

For example; the vapour of water, what is it but water rarified and ſcattered in the air? ſmoak, what is it, but an exhalation of wood or other matter reſolved?

II *Vapour is generated of the groſſer Elements, earth, water, air; as of all mixt bodies.*

Of water the matter is evident. For being ſet to the fire it evaporates viſibly; ſet in the ſun it evaporates ſenſibly, becauſe even whole Pools, Rivers, Lakes are dried up by little and little, by the heat of the ſun. That the earth exhales, you may know by ſenſe, if you put a clot into a diſh, (of earth or pewter) and pour in water ſo oft upon it, and let it evapourate with the heat, till there is nothing left, neither of the water, nor of the clay. For what is become of the clot? it is ſure enough turned

into aire, with the parts of the water.

The vapour of air is invisible; yet it appears, that there is some. 1 In a living body, where all acknowledge that there are evaporations through the skin and the hair. For then the vapours that go out, what are they but the vapours of the inward vapours, far more subtle then the vapours of water? 2 Fruits, herbs, spices, &c. dried, yea very dry, spread from them an odour, now an odour what is it but an exhalation! But not (in this place) a watery exhalation (being that there is not any thing watery left in them:) therefore airy.

That mixt bodies do vapour is without doubt: forasmuch as the Elements of which they do consist do vapour. Understand not only soft bodies (sulphur, salt, herbs, flesh, &c.) but the very hardest. For how could a thunder-bolt be generated in the clouds, if stony vapours did not ascend into the cloud? and it is certain that stones exposed to the air for some ages, (as in high towers) grow porous: how, but by evaporation? and what is the melting of metals, but a kind of vaporation? for though the metall return to its consistency, yet not

in

in the ſame quantity, becauſe ſomething is evaporated by putting to the heat.

III *Heat is the efficient cauſe of vapour; which witherſoever it diffuſeth it ſelfe, attenuating the matter of bodies, turns it into vapour.*

For this is the perpetuall virtue of heat, to rarifie, attenuate, and diffuſe.

IV *All is full of vapour throughout the world.*

For heat, the begetter of vapours, is no where wanting: ſo that the World is nothing elſe but a great Vaporarie, or Stove. For the earth doth alwayes nouriſh infinite ſtore of vapours in its bowels: and the ſea boiles daily vvith inward vapours, and the air is ſtuft full of them every vvhere. And vve ſhall ſee hereafter, that the skie is not altogether free from them. But living bodies of Animals and Plants, are nothing but ſhops of vapours, and as it vvere a kind of Alembecks perpetually vaporing, as long as they have life or heat.

V *Vapours are generated for the progenerating of other things.*

For all things are made of the Elements, as it is vvell known, Stones, Herbs, Animals, &c. but becauſe they cannot be made

unleſſe the Elements themſelves be firſt founded, they muſt of neceſſity be melted; vvhich is done vvhen they are reſolved into vapours, and variouſly inſtilled into things, to put on ſeverall formes. And hence it is that *Moſes* teſtifies, that *the firſt ſeven days of the world, when there was yet no rain, a vapour went up from the earth, to water the whole earth:* that is all things growing out of the earth. *Read with attention, Gen. 2. ver. 4,5,6.*

V I *Vapours are the matter of all bodies.*

For vvho knoweth not, that vvaters and oiles are gathered out of the vapours of Alembicks? vvho ſeeth not alſo, that ſmoak in a chimney turns into ſoot, that is black duſt? yea that ſoot gets into the wals of chimneys, and turnes into a ſtony hardneſſe? After the ſame manner therefore that clouds, rain, hail, ſtones, herbs, are made of the condenſed vapours of the Elements, and living creatures themſelves, (and in them bloud, fleſh, bones, hairs) are nothing but vapours concrete, vvill appear more clear then the light at noon day.

V I I *Vapours then are coagulated, ſome into liquid matter, (as water, ſpittle, fleſh or pulp) ſome into conſiſtent matter, (as ſtones, bones, wood, &c.)*

That

That appears, becauſe thoſe liquid things may be turned into vapours, and conſiſtent things into ſmoke. which they could not, if they were not made of them, for every thing may be reſolved into that onely, of which it is made.

VIII *The motion of vapours with us is upwards, becauſe among the thicker elements, they obtein the nature of thinner.*

For certainly the vapour of water is thinner then water, it ſelf, yea, thinner then the very air: which though it conſiſt of ſmaller parts, yet they are compacted. And therefore vapor ſuffers it ſelf to be preſt neither by water nor air, but frees it ſelf, ſtill getting upwards, & hence it is, that plants grow upwards, becauſe the vapour included ſpreading it ſelf, tends upwards.

IX *One vapour is moiſt, another dry; one thin, another thick; one mild, another ſharp, &c.*

For thoſe qualities which are afterwards in bodies, are initially in their rudiments, that is vapours; which we may know by experience. For dry ſmoak pains the eyes: which a humid vapour doth not: there you have ſharpneſſe: ſmels alſo, (which are nothing but exhalations of things) do not they

ſuffi-

sufficiently manifest sharpnesse, sweetnesse, &c? and *Chymicks* gather *Sulphur*, *salt*, and *Mercury* out of smoak. Therefore all qualities are in vapours more or lesse: whence the bodies afterwards made of them, get such or such an habit or figure.

X *Vapours gathered together, and not coagulated, cause wind in the air, trouble in the sea, earthquake in the earth.*

Of winds.

XI *Wind is a fluxe of the air, ordained in nature for most profitable ends*

For winds are 1 the besomes of the world; cleansing the elements, and keeping them from putrefying. 2 the fan of the spirit of life, causing it to vegetate in plants and all growing things. 3 the charriots of clouds rains, smels, yea, & of heat & cold, whether soever there is need that they should be conveyed. 4 Lastly, they bestow strong motions for the uses of men (as grinding, sailing)

XII *The ordinary cause of wind is store of exhalations one where, enforcing the air to flow elsewhere.*

We may in our hand raise a kind of wind four manner of ways; namely by forcing or compressing, rarifying and densifying air, (which shall be shewed by examples by

by and by) and so many wayes are winds raised in the world, yet they are all referred to that first cause, vapours, as shall be seen by and by. I said that wind may be raised by us by forcing, compressing, rarifying, or densifying; that may be shewn to children by ocular experiments, for if you drive the air with a fan, doth it not give a blast? if you presse it when it is drawn into the bellows, doth it not breath through the pipe? if you lay an apple or an egge into the fire, doth not the rarified humour break forth with a blast? but this last will be better seen in a bowle of brasse (which hath but one hole) put to the fire: especially if you drop in some drops of water. For the air shut in with the water, when they feel the heat, will presently evaporate, and thrust themselves out with a violent blast. Which may be also seen, if you put a burning wax candle into a pot well stopped (having a small hole left at the side) &c. The fourth way is by condensation of air: if for example, you lay the foresaid bowle of brasse very hot upon ice, and force the thin air included to be condensed again with cold, you shall perceive it to draw it again from without, to fill up the hollownesse of the bowle. Therefore

fore so many ways winds are made under heaven; either because the air is rarified with the heat of the Sun, and spreads it self; or because it contracts it self with being cold, and attracts from elsewhere to fill up the spaces; or because a cloud scattered, or falling downward; or else blasts somewhere breaking out of the earth compresse the air, and make it diffuse: or lastly, because one part of the air being moved, drives others before it, (for here you must remember what was said before. 1 that a drop of water turned into air, requires an hundred times more space. 2 that the air is a very liquid and moveable element: and therefore being but lightly pushed, gives back a long way.) but yet it is plain that all those motions of the air take their first rise from vapours. Now because the world is a great globe, it affordeth great store of blasts also, both the heat of the sun above, and the parching of the fire under ground, begetting various vapours.

Hence it is understood, why after a great fire there arises a wind presently, (even in the still air?) namely, because much solid matter, (wood and stone, &c.) is resolved into vapours, and the air round about is attenuated

tenuated by the heat of the fire, that it must of necessity spread it self, and seek a larger room.

XIII *Winds in some countreys are certain, comming at a certain time of the year, and from a certain coast; others are free, comming from any place.*

Note they call these ἐτησίας, which is as much to say as annuall: which are caused either by the mountainousnesse of the tract neer adjoyning, wherein the snows are then dissolved; or to be sure some other causes, by reason of which vapours are then progenerated there in great abundance. But you must note, that those etesian winds are for the most part weak and gentle, and yield to the free winds.

Note 2 There is also another kind of set wind, common to the whole world; namely a perpetuall fluxe of the whole air, from the east to the west. For that there is such a wind. 1 they that sail about the æquator testifie. 2 in the seas of *Europe*, when a particular wind ceaseth; they say also that a certain gentle gale is perceived from the east 3 and therefore Marriners are constantly of opinion, that the navigation from east to west is speedilieſt performed. 4 lastly, with

us

us in a clear and ſtill skie, the higheſt clouds are ſeene for the moſt part to be carried from Eaſt to Weſt. therefore wee need not doubt of this generall wind, if ſo be any one will call it a wind. For it proceeds not from exhalations, but from the heaven, which by its wheeling round, carries the air perpetually about, ſwiftly above, here nigh the earth (where the clouds are) almoſt inſenſibly, yet under the æquator (as being in a greater Circle) very notably. Whence this Probleme may be profitably noted, why the *Eaſt wind dries, but the Weſt moiſtens?* namely, becauſe that being carried along with the air attenuates it the more; but this ſtriving againſt the air condenſeth it.

XIV *A gentle wind is called* aura, *a gale; a vehement wind overthrowing all it meets with* procella, *a tempeſt*; *if winded into it ſelf* turbo *a whirlewind.*

It is plain that ſundry vvinds may ariſe in ſundry places together, according as matter of exhalations is afforded here and there, and occaſion to turn it ſelf hither or thither. Therefore if they flovv both one vvay, the wind doubled is the ſtronger; if ſideways, or obliquely, the ſtronger carries away the weaker with it, and there is a change of the

vvind

wind which we ſee done often, yea daily, but when they come oppoſite to one another, and fall one againſt another, they make a ſtorme or tempeſt; vvhich is a fight of the vvinds till the ſtrongeſt overcome, and is carried vvith a horrible violence bearing dovvn all before it. But contrary vvinds of æquall ſtrength make a vvhirlvvind, vvhen neither vvill give ſidevvay, but both vvhirl upvvards, vvith a violent gyration.

Of the ſea-tide.

XV *The ſea-tide is the daily fluxe of the ſea to the ſhore, and refluxe back again.*

The ſea hath its fluxes leſſe unconſtant then the air, for it flows onely to the ſhores, and back again the ſame vvay: and tvvice a a day it flowes up, and twice it ebbs again. The end thereof vvithout doubt is, to keepe the vvaters of the Sea from putrefying by that continuall motion. But the efficient cauſe thereof heretofore accoun ted amongſt the ſecrets of nature comes novv to be ſearched out of the trueſt gr ounds of naturall Philoſophy, and more accurate obſervations.

XVI *The cauſe of the ſea-tide, are vapours within,*

within, wherewith the sea swelling diffuseth it self, and falling settles down again.

For this tide is like to the boiling of vvater, seething at the fire; vvhich is nothing but the stirring of the vapours raised in the vvaters by the force of the heat. For it is impossible that the vvater should not be resolved into vapours by the heat: impossible that the vapours should not seek a passage (upvvards) to their connaturals. yet impossible that they should have an easie passage out of the vvater, (being that the superficies of the vvater, yea the vvhole masse thereof, being a diffused liquor like liquid glasse, hath fewer pores than the earth or wood, or a stone:) therefore it is impossible that the water should not swel, rise up, dash it self against the sides of the kettle, and at length break in a thousand openings, and give the heat dancing & evapourating a passage out, by reason of the vapour raised & multiplied vvithin, and striving upvvard: all vvhich vve see in a boiling pot. In the same manner the sea svvels, by reason of the vapour that is multiplyed in the bottome of its gulfes, and lifts up it self into a tumour, & of necessity spreads it self to the side, neither doth it make any thing against this, that the vvater

of

of the sea boiling is not so hot as the water of a boiling pot. For here the vast quantity doth not admit of so great heat over such deep gulfes. For the water of a kettle heats at the bottome, but the superficies begin to swell and turn about before they heat.

XVII *Vapours within the sea, are chiefly generated by by the fire under ground.*

They referre it commonly to the cælestiall fire, the Sun, and the Moon. But that is likely to be as true, as that we see a pot of water to boile, set in the sun, though never so hot. For who ever saw that? the Sun may lick the superficies of the water, and so consume it by little and little, and turn it into vapour: but nothing can make it boil at the bottome, but fire put under it. Therefore the cause of the vapours within the sea, must of necessity be placed underneath: namely that fire under ground, which the whole nature of inferiour things, demonstrate to be shut up there.

XVIII *The vapours and tides of the sea are provoked by the heat of heaven, (the Sun.)*

A labouring man, or a traveller, sweats easily enough by his inward heat, (stirred

up

up by the motion of his body) but a great deal more easily in the heat of Summer, then in Winter; and all of us sooner in a bath then else-where: the outward heat provoking the inward. In like manner the sea vapours and boiles vvithin, but yet after the harmony of the superiour fire which is from the stars. Which harmony is seen also in yielding us vvater from the clouds and fountains. For in rainy vveather fountains flow more abundantly; in dry vveather they dry something, both which God intimated, *Gen.*7. *v.*11. and *Deut.*28. *v.* 23. Now the cause is, *the harmony of fire to fire*; of the cælestiall to the subterraneous, &c. as it shall elsewhere appear.

XIX *The Sea flowes twice a day, according as the Sun comes and goes,*

For the Sun ascending to the Meridian, attracts the vapours of the sea, and causes the waters to be elevated and diffused: descending to the West, it suffers them to fall again. Now that the waters swell again at the Sun setting, and fall as he hastens to the East; the cause is the same which in boyling pots: where the hot water is seen to boile, and to be elevated, not only in that part which is toward the

the fire, but alſo on the contrary; but to fall again on the ſides both wayes. So the Sea is a caldron, which the Sun (the worlds fire) encompaſſing, makes to ſwell up on both the oppoſite parts, but to fall in the intermediate parts; ſo that this ſea-tide following the Sun, goes circularly after a perpetuall law.

XX *The fluxe and refluxe of the ſea is varied according to the motion of the Sun and Moon, and the ſite of places.*

For 1 in Winter it is almoſt inſenſible, the Sun but weakly raiſing the ſubterrane vapours. 2 When the Moon is in conjunction or oppoſition to the Sun, the ſeas ſwell extraordinarily; the force of both luminaries being joyned together to affect the inferiour things (either joyntly or elſe oppoſitely.) Alſo the Moon encreaſing the flowings are ſomething retarded, decreaſing they are anticipated: which gave occaſion to the ancients to think that it was cauſed by the Moon alone. 3 Thoſe ſea fluxes and refluxes vary alſo according to the divers turnings and windings of Countries and Promontories, and the ſhorter or longer coherence of inlets with the Ocean; which cauſeth them to be perceived in ſome pla-

ces sooner, in others later. But enough of the sea tide, the earthquake followes.

XXI *An earthquake is the shaking of the superficies of the earth in any countrey ; arising from subterrane exhalations, gathered together in great abundance, and seeking a passage out.*

Therefore it ceaseth not till the said exhalations are either scattered through the cavities of the earth, or else break forth.

XXII *Earthquakes are sometimes so horrible that they subvert Cities, Mountaines, Islands, with an hideous bellowing howling, and crashing.*

Which formidable effects cause us to suspect, that those vapours are then mixt, like to those by which thunders are caused in a cloud: and that not simply by the blast of the exhalations, but by their burning, so that they are a kinde of subterrane lightnings: yet I thought good to make mention of it here together.

CHAP. VIII.

Of concrete substances: namely, Stars, Meteors, and Minerals.

I *A Concrete thing is a vapour coagulated, endued with some form.*

For

For example, foot, clouds, snow, &c. Note that this name of *concrete*, and *concreature* is new, yet fit to expresse this degree of creatures, which confers nothing but coagulation and figure.

II *The primary cause of concretion of vapours is cold, which whereseever it findeth a vapour, condenseth and coagulateth it.*

That appears in Alembicks, where the vapour raised by heat, and carried into the highest region of it where it is cold, resolves it selfe again into water: and to that end Distillours now and then wash the uppermost cap of the Alembick with cold water, and make the pipes, through which the concrete liquour distils, to passe through a vessell of water. Yet heat helps the concretion of things, consuming the thinner part of the concrete, and compelling the rest to harden, which we see done in the generation of metals.

III *Some concretes are Æthereall, others aereall, others watery, others earthly.*

Namely, because some are made in the skie, as *stars*: others in the air, as *clouds, &c.* others in water, as a *bubble, &c.* others in the earth, as *stones, &c.* every one of which come to be considered apart.

IV *Æthereal concretes, are ſtars and comets.*

V *Stars are fiery globes, full of light and heat, with which the skie glitters on every ſide.*

Both the ornament of the world required this, that hanging lamps ſhould not be wanting in ſo lofty a palace: as alſo the neceſſity of the inferiour world, concerning which is the following Aphoriſme. Now we reckon *ſtars* in the rank of *concretes*, becauſe it is certain that they are made of matter and light.

Stars were produced in ſo great number upon very great neceſſity.

Namely, 1 To heat the earth with a various temperature. 2 To make the various harmony of times. 3 To inſpire a various form into the creatures. For ſo great variety could not be induced into the lower world, without ſuch variety in cœleſtiall things.

VII *God placed the greateſt number of ſtars in the higheſt heaven round about, that they might irradiate the earth on every ſide, and carry about their ſphear with a rapid motion of heat.*

Of which ſtarry ſphear take theſe following Aphoriſmes.

1 That the motion of this ſphear is finiſhed in the ſpace of twenty four hours.

2 And becauſe that motion is circular, it

is said to be made upon two *hinges*, or immoveable points (in *Greek poles*) of vvhich the one is called the *Northern or Artick pole*; the other the *Southern or Antartick*. Betwixt these two poles the heaven is turned: vvith its exact globosity, describing a circle (in the midst betwixt the two poles) vvhich they call the *Æquator*. Now that tract, vvhere the stars arise above the earth, is called the *East, or the Sun-rising*: the opposite to it vvhere they set, is called the *West or Sun-setting*; and these four angles of the World, are called the four *quarters* of the World, and the four *Cardinal Points*.

3 That the stars of the highest sphear, (commonly called the fixed stars) are globes of vvondrous greatnesse in themselves: the greatest of them exceeding the globe of the earth an hundred and seven times: and the least of them exceeding the same globe eighteen times.

4 That the numerable stars are found by us one thousand, tvventy tvvo: but God knovves the number of the innumerable. For the *Galaxias* or milky way (it is the whitest tract of heaven) is found by accurate perspectives to be a company of very sma

ſtars; and there are ſome other like tracts obſerved in heaven, though leſſe, and of theſe the vvords of God, *Gen.* 15. *v.* 5. are to be underſtood.

5 That the viſible ſtars reduced into certain figures, vvhich they call cœleſtiall ſigns in number 69, 12 vvhereof about the Æquator, are by a peculiar name called the Zodiaque. But this Zodiaque declines with one half of it toward the North, with the other part towards the ſouth. the ſignes are comprehended in this diſtick.

1 2 3 4 5
Sunt *Aries, Taurus, Gemini, Cancer, Leo,*
6
Virgo:
7 8 9 10 11
Libraque, Scorpius, Arcitenens, Caper, Hydria,
12
Piſces.

1 2 3
The Ram, the Bull and Twins to th' Spring belong;
4 6 5
To Summer Crab and Maid and Lion ſtrong.
7 8 9
Autumne hath Scales and Scorpion & the Bow:
10 11 12
Goat, Water-tanckard, Fiſhes Winter ſhow 6

6 That the distance of this starry sphear from the earth is found above two hundred thousand semidiameters of the earth, and a semidiameter of the earth contains 3600 of our miles.

VIII *A very great portion of most ardent light is conglobated in the sun, so that it may seem the onely fountain of light and heat.*

For were it not for the sun we should have perpetuall night, for all the rest of the stars: forasmuch as at high noon, we are in darknesse presently, if the sun be but covered.

Now touching the sun these following Axiomes are to be noted.

1 That it was made so great as might suffice, both to illustrate the whole world, and to heat and vaporate the whole earth: that is 160 times greater than the earth

2 That it is such a distance elevated from the earth, as might serve, so as neither to burn it, nor leave it destitute. *Psal.* 19. *v.*7. for it is placed almost in the middle space betwixt the starry sphear and the earth.

3 That it is carried with a slower motion then the stars in their highest sphear. For whereas it seems to be turned about equally, as the starrie sphear is, yet it is every day

left behind almoſt a degree, (of which the whole circuit of the ſphear hath 360) whence it comes to paſſe, that in 365 dayes, it compaſſeth the whole ſpear as it were going back, and after ſo many dayes returns to the ſame ſtar again. And this we call *the time of an year, or a ſolar year.*

4 And that it may ſerve all ſides of the earth with its light and heat, (to wit by turns) that retardation is not made ſimply though the middeſt of the world under the *Æquator*: But under the *Zodiack*, bending to the North on this ſide: to the South on that ſide Whence comes the diviſion of the year into four parts; (*Spring, Summer, Autumn and Winter*) and the inequality of dayes to thoſe that inhabite without the equinoctiall. For when it declines to thoſe on the North it makes ſummer with them, and the longeſt days, and ſo on the contrary. And by how much it is the more verticall to any part of the earth, it heats it ſo much the more, by reaſon of the direct incidence and repercuſſion of the rayes.

IX *And becauſe it was not convenient that the ſunne and ſtars ſhould always operate after one and the ſame manner* (for variety is both pleaſing and profitable to all nature) *there*

were

were six other wandring starres added over and besides, which running under the same Zodiaque and by certain turns entring into conjunction one with another, and with the Sunne might variously temper his operation upon inferiour things.

These wandring starres are called *Planets*, of which there are seven, reckoning the sun for one.

X *The Planets therefore are the Suns coadjutors in governing the world: which differ in site, course, magnitude and light.*

XI *Three of the Planets Saturn (♄) Jupiter (♃) Mars (♂) are above the Sun: Venus (♀) Mercury (☿) and the Moon (☽) below: so in a most decent manner, as it were compassing about the sides of their King.*

It is probable, that the stars are carried higher or lower in heavē, for the same reason as clouds in the air, or wood in water, that is, according to their different degrees of density or rarity. For as thick wood swims under the water either with all or with half of its body covered, but light wood swims on the top: and watry clouds ascend not far from the earth, but dry and barren clouds very high: so the globes of the stars

are

are carried ſome higher than others according to the thickneſſe of their matter and light.

XII *The upper Plane s are bigger then the earth, but the lower are leſſer.*

For it is found that	♄ ♃ ♂ ☉	doth equall	91 95 2 160	Globes of the earth.
	♀ ☿ ☽	doth cõtein the	28 101 39	part of the earth.

XIII *By how much the higher any Planet is, and neerer to the higheſt ſphear, ſo much the ſwifter it moveth; by how much the lower and neerer to the earth, ſo much the ſlower.*

For Saturn, becauſe he is next to the eighth ſphear, is rolled about almoſt equally with it, yet he alſo fals back by little and little: ſo that he runs through the Zodiaque moving backward in the ſpace of almoſt thirty years: Jupiter in twelve years: Mars in almoſt two: the Sun (as was ſaid) in a year: Venus encompaſſeth the Sun in five hundred eighty three dayes: Mercury in one hundred and fifteen dayes: the Moon becauſe ſhe is ſloweſt of all, remaining behind every

every day 13 deg. measures the Zodiaque in 27½ dayes.

XIV *The higher Planets do so observe the Sun, that approaching nigh unto him, they betake themselves into the highest place; going from the Sunne, they sinke lower towards the earth.*

And for this cause both their magnitude and their motion vary in our eyes. for when they are neerer to the earth, they seem greater; but more remote lesser. Again, the higher they are, the slower they move, and then they are called *direct*; the lower they descend the swifter, so that they seem either *stationary*, (keeping pace for some weeks with the same fixed stars) or else *retrograde*, sometimes outstripping them in their course.

XV *Venus and Mercury depart not from the Sun, unlesse it be to the sides both ways: Venus 47 degrees, Mercury 23 degrees. So that sometimes they go before the Sun, sometimes they follow him, sometimes they lie hid under his rayes.*

Note, *Venus* when she is the morning star and goes before the Sun is called φώσφορος, or *Lucifer*: when she is the evening star she is called *Hesperus*.

XVI *As for their light, Mars is very fiery*

fiery and calefactive: ♄ *is pale and very frigifactive:* ♃ and ♀ *are of a benigne light:* ☿ *changeably sparckling:* ☽ *shines with a borrowed light onely: of which more by and by.*

Note. That the stars and planets do not sparkle by reason of their greater distance, (for then ♄ should sparkle more then *Mercury:* vvhereas we find the contrary) but by reason of their flaming. For fire or light cannot rest, therefore the polar stars, because they are least stirred with the common motion, twinckle most.

XVII *Because the Moon is near to the earth, and placed in a grosse air, she moves most slowly; and also her body is grosse and obscure, like a globous cloud.*

For it is not distant from the earth above 60 semidiameters of the earth.

The Moon by reason of her opacity doth not shine of her selfe, or else very weakly: but on that side that she is illuminated by the Sun, on that side she shines like a looking glasse, the other halfe being obscure.

Note. Because the Moon was to rule the night, a weak light, and that but borrowed was given her, and because she was appointed to shew lesser times (Months) a motion diffe-

different from the Sun was given her, that by her departure from the Sun, and by her returning, she might designe the progresse of the moneths: and that it might be done more evidently, she was placed below the sun, that she might appear to us with her face enlightned after divers manners. For vvhen she runs with the Sun in the same signe of the Zodiack, she doth not appear to us; because her enlightned face is turned toward the Sun, but her obscure face to us. But when she is opposite to the Sun, we beholding her on the same side which looketh toward the Sun, see all her luminous face. Lastly, in the intermediate places we see her encreasing or decreasing in light; according as she turns her enlightned face to us, or turns it from us, by reason of the diversity of her position in respect of the Sun, and us.

XIX *When the Moon, at the change, comes directly under the Sun, she obscures him as to us; when at the full, she is directly opposite to the Sun, she enters into the shadow of the earth, and is her selfe obscured: and this they call the Eclipses of the Luminaries.*

Hence it appears that the Sun is not obscured after the same manner that the Moon

is. For the Moon is really obſcured, that is deprived of light, as being fallen into the ſhadow; but the Sun is not deprived of light, but is only covered from us, that it cannot as then enlighten the earth with his rayes; therefore the earth is then more truly eclipſed then the Sun.

Now God ordained Eclipſes 1 That we might underſtand, that all our light is from the Sun. 2 That the magnitude of the Luminaries, and of the earth might be found out. 3 To finde the true longitude of countries; but that belongs to Aſtronomers, this laſt to Geographers.

Of Comets.

XX *Comets are acceſſory ſtars, which ſomtimes ſhine, and go out again: for the moſt part with tayles, or buſhes of hair.*

We reckon them to the heaven and ſtars, not to the air and meteors: becauſe they are not generated in ſublunary places, (as *Ariſtotle* thought) but in the higheſt Heaven, even above the Sun: which 1 Their motion, ſwifter always then the Moon it ſelfe. 2 Their parallax, leſſe then the Moons, ſomtimes none at all, do ſhew.

XXI *Comets are not vapours kindled; but a reflexion of the Suns light, in vapours ſo far elevated.*

The

The first is easily proved. For if a Comet were a vapour kindled, it could not last halfe an hour. (For nothing can be kindled but a sulphury matter, but that is consumed in a moment, as it appears in Gunpowder, Lightning, a Chasme, a falling star, &c.) but histories relate that comets have lasted three years. The second is shewed, because comets 1 Cast a taile from the Sun, as the Moon doth a shadow; (for those dry vapours are not an opacous body, like to the Moon, but semidiaphanous.) 2 They are eclipsed (as *Campanella* testifies) by the shadow of the earth, as well as the Moon: which would not be, if they burned with their own fire.

N. W. That which is reported of a sulphureous matter, or stone, which fell from a burning comet, if it be true, it is to be thought, that it was made of some fiery meteors, not of a comet.

XXII *The ends of comets are, that it may appear*; 1 *That the whole heaven moves, not the stars only.* 2 *That it is liquid and transmeable, not hard like Chrystall.* 3 *That vapours ascend so high, and that there are mutations every where in this visible world.*

Vapours, I say, whether exhaling from this

this our inferiour world, or from the super-celestiall waters. For there is nothing to the contrary, why we should not hold, that they also exhale, and are spread abroad into the thinner region of the stars.

Of aëriall Concrets, that is, Meteors.

XXIII *By reason of the perpetuall confluxe of exhalations in the air from all the Elements, many things are daily there concreted, but of small continuance.*

For the air is full of exhalations, even when it seemeth clear. For it cannot be so pure here near the earth, but it will have something watery, oily or salt alwayes admixt with it. Things concrete of these were anciently called Meteors, because they are made on high: for μετέωρος signifies high.

XXIV *Of humid exhalations are made watery meteors: fiery of dry.*

XXV *Watery meteors are, mists, clouds, rain, hail, snow, dew, frost.*

We must see them every one apart, how they are made.

XXVI *A mist is a watery exhalation half concrete, which being that by reason of its density it cannot elevate it selfe, creeps on the ground.*

XXVII *A cloud is a gathering together of thin*

thin vapours, and elevated upwards, in the higheſt of the air.

They are gathered together moſt of all over the ſea, and ſtanding waters, becauſe there moſt exhalations are made, and from thence they are driven through divers parts of the world by the windes, and increaſed with exhalations ariſing elſewhere. Hence in every region, rain comes, moſt often from that part, which lies neareſt to the ſea; as with us from the Weſt.

XXVIII *Rain is the reſolution of a cloud into water, and the falling of it by drops.*

N. 1 That reſolution is alwayes made by the condenſation of the vapour, but there is not alwayes the ſame efficient cauſe of its condenſation. For ſometimes cold condenſeth a vapour, as in the head and pipe of an Alembick (which muſt needs be cooled) we ſee: ſometimes the very compreſſion it ſelfe, or conſpiſſation, as it is plain in the roof of baths, and the cover of a boiling pot. But neither of theſe cauſes is wanting to beget rain: being that the middle region of the air is cold, and the cloud being preſſed together by the vapours alwayes aſcending, muſt of neceſſity be diſſolved. And this is the cauſe, why the burning heat

of the air is a fore-teller of rain: because then it is certain that the air is thickned.

N. 2. That rain is better for fields and gardens then river water, because it hath a kind of a fatnesse mixt with it, from the evaporations of the earth, minerals, plants, and Animals, wherewith it gives the earth a most profitable tincture.

N. 3 Sometimes wormes, small fishes, frogs, &c. fall with the rain, which, as it is very likely, are suddenly generated within the cloud, of vapours gathered together of the same nature, by virtue of a living spirit admixt therewith; as in the beginning, at the Command of God, the waters brought forth creeping things and fishes in a moment.

XXIX *Hail is rain congealed.*

For when the Sun beams in the greatest heat of Summer, have driven away all cold from the earth into the middle region of the air, it comes to passe that that vehement cold doth violently harden the drops of rain passing through them, and forces them to turn to ice: and therefore haile cannot be procreated in Winter, the cold abiding then near the earth, not on high.

XXX *Snow, is a resolution of a cloud into*

mist

moſt ſmall drops, and withall a thickning of them with a gentle cold.

N. 1 It falls only in Winter: becauſe the vapours are not elevated by the weak rayes of the Sun, ſo far as the middle (that is the cold) region; here then near the earth, the reſolution is made in a milder cold, and withall the congelation is very mild. 2 The whiteneſſe of the ſnow is from the conjunction of the parts of the water: the ſame comes to paſſe in broken ice, and in the froth of water.

XXXI *Dew is a thin vapour* (or elſe the air it ſelfe) *attracted by the leaves of plants, and with their coldneſſe condenſed into water.*

For it is no where, but upon plants; and that in the heat of ſummer, when the plants are colder then the air it ſelfe. Now this turnes to the great benefit of the plants; for by that means they are moiſtned, at the very drieſt time of the year. And therefore they are produced alſo in thoſe countries which know no rain.

XXXII *Froſt is congealed dew.*

Therfore there is none, but in winter, when cold reigns by reaſon of the ſuns abſence.

Of fiery Meteors.

Fiery meteors are those, which arise from fat fumes, kindled in the air: the principal kinds of which are seven; *a falling star: a flying dragon: lightning: flying sparks: ignis fatuus: a torch: and ignis lambens.*

XXXIII *A falling star is a fat and viscous fume, kindled* (by an antiperistasis, that is an obsistency of the cold round about) *at the upper end of it, the flame whereof following its fuell is carried downward, till it fail also and be extinguished.*

For they are to be seen every clear night, in winter more then in summer: and you may see the like spectacle, if you kindle the fat fume of a candle put out with another candle put to it above. This falling star is made of a grosse vapour; and by reason of its grosseness hanging together like a cord. Therefore it burns so violently, that falling upon a man it burns through his garment. Look which way it tends with its motion, it foretels wind from that part.

XXXIV *A flying dragon, is a long, thick, fat fume, elevated in all its parts: for which cause being kindled, it doth not dart it selfe downward, but side-wayes like a dragon, or sparkling beam.*

This

This meteors is not so often seen: and therefore they that are ignorant of the naturall causes, think that the Divell flies.

XXXV *Lightning is fire kindled within a cloud, which flying from the contrary cold, breaks out with an horrible noise, and for the most part casts the flame as far as the earth.*

The World is the Alembick of nature, the air the cap of this Alembick: the sun is the fire: the earth, the water, minerals, plants, &c. are the things which being softned with this fire, exhale vapours upward perpetually. So there ascend, salt, sulphury, nitrous, &c. vapours, which being wrapped up in clouds, put forth various effects, for example, *When sulphury exhalations are mixt with nitrous,* (the first of a most hot nature, the second most cold) they endure one another so long, as till the sulphur takes fire. But as soon as that is done, presently their followes the same effect as in gun-powder, (whose composition is the same of Sulphur and Nitre) a fight, a rapture, a noise, a violent casting forth of the matter. For thence it is that a viscous flaming matter is cast forth, which presently inflames whatsoever it touches that is apt to flame, and smiting into the earth, it turnes

to a ſtone, and being taken out after a time, is called a *thunder-bolt*.

XXXVI *Flying ſparks are a ſulphury fume ſcattered into many ſmall parts and kindled*.

It is ſeldome ſeen as likewiſe thoſe that follow.

XXXVII *Ignis fatuus, is a fat and viſcous fume, which by reaſon of its groſſeneſſe, doth not elevate it ſelfe far from the earth, and being kindled, ſtraggles here and there, leading travellers ſometimes out of their way, and into danger.*

XXXVIII A torch is a fume like it, but thin, and therefore elevated upwards: which being kindled. burnes a while like a candle or lamp.

XXXIX Ignis lambens, is a fat exhalation coming from a living body, heated with motion, and kindled at its head, or near about.

It ſometimes befalls men and horſes, vehemently breathing after running, that the ardent vapours ſent forth, are turned into flames.

Of appearing Meteors.

Appearing Meteors, are the images of things in clouds, variouſly expreſſed by the incident light: of which ſort there are obſerved

ſerved ſeven: *Chaſma, Halo, Parelius, Paraſelene, Rods, Colours, the Rainbow.*

XL Chaſma (a pit) *is the hollowneſs of a cloud, making ſhew of a great hole.*

It it by reaſon of a ſhadow in the midſt of a cloud, the extremities whereof are enlightned. You may ſee the like almoſt in the night by a candle, on a wall, which hath any hollowneſſe in it, though it be whitiſh.

XLI Halo (a floor) *is a luminous circle, when the vapours underneath the ſun, or moon, are illuſtrated with the rayes of the luminary.*

You may ſee the ſame by night in a bath, or any other vaporous place, about a burning candle. It is ofteſt ſeen under the moon, becauſe the ſun with his ſtronger rayes either penetrates or diſſipates the cloud.

XLII Parelius (a falſe ſun) *is the repreſentation of the ſun upon a bright cloud placed by its ſide.*

After the ſame manner, if you ſtand upon the oppoſite bank of a river, you ſhall ſee two ſuns; the one, the true one in heaven, the other reflected in the water. There are ſometimes three ſuns ſeen, if two of

those clouds are at once opposed to the sun; and our sight.

XLIII *Parasélene* (a false moon) *is the image of the moon expressed after the same manner, upon a collaterall cloud.*

XLIV *Rods, are beams of the sun covered with a cloud, yet shining through the thin cloud, stretched towards the earth like rods.*

XLV *Colours are they that appear divers in a cloud, according as it is after severall manners turned toward the sun and us; so that the cloud seems somtimes yellow, somtimes red & fiery.*

XLVI *Lastly, the Rainbow is an Halo opsite to the sun or moon, in a dewy cloud, representing a bow of divers colours.*

For there are Lunar rainbows also. Now that the Rainbow is an appearing Meteor, is plain, if it be but from hence, that it comes and goes backwards and forwards with the eye of the beholder; and so it appears to be in severall places, to those that behold it from severall places, even as the image or brightness of the sun, to those that walk up and down on the shore. I say that it is *a Meteor like to an Halo*, because it is alike circular. And as in the *Halo, the center of the luminary, the center of the lightsome circle, and the cen-*

ter

ter of our eye are in one right line, ſo in a Rainbow: onely that in the firſt the luminary and the eye are the extreams, the *Halo* in the middeſt: here the luminary and the bow are the extreams, and the eye in the middeſt. Now there doth not appear a whole circle in the rainbow, becauſe the center of it to us fals upon the earth, and ſo the upper halfe of the circle only appears. If any one could elevate himſelfe into the cloud, or above the cloud, without doubt he would ſee the whole circle of the Rainbow. Hence alſo the reaſon is evident, *Why at the ſuns riſing or ſetting there appears a whole ſemicircle elevated right up towards heaven; but when the ſun is high, it appeares low. Laſtly, Why there can be none at all when the ſun is verticall.* The Lunar Rainbowes are onely pale, as an *Halo*: the Solar ſhewes forth moſt fair clouds, from a ſtronger light diverſly reflected from a thouſand thouſand drops, (of the melting cloud:) the colours being coordinate, as is to be ſeen in a *Chryſtalline Priſme*: and certainly *the Rainbow was given even for this, that we might learn to contemplate the nature of colours.* There is alſo a *contra iris*, namely when the rainbow re-

flects

flects again upon another cloud underneath; and therefore it is lesse and of a weaker colour, and the order of the colours inverted; so that the higheſt is loweſt, as in a glaſſe the right ſide anſwers to the left ſide, &c. but of Meteors enough.

Of watery Concretes.

XLVII Watery concretes are: *a bubble, ſoame, ice, and ſeverall appearances in the water*: alſo *the ſaltneſſe of the ſea, ſpring Waters, and medicinall waters.*

XLVIII A bubble is a thin watery skin, filled with air.

It is made when a ſmall portion of air thruſt down below the water is carried upwards: which the water, being ſomwhat fatter in its ſuperficies, ſuffers not preſently to flie out, but covers it with a thin skin, like a little bladder. By how much the more oily the water is, by ſo much the longer the bubbles hold: as it is to be ſeen in thoſe ludicrous round bubbles, which boyes are wont to blow out of water and ſope, (which flie a great while through the air unbroken.) From the bubble we learn, to what a ſubtilty water may be brought. For the skin of a bubble is a thouſand times thinner then the thinneſt paper.

XLIX Foams

XLIX Foame is a company of very ſmall bubbles, raiſed by the ſudden falling of water into water.

The beating of the water into ſmall parts cauſes whiteneſſe in the foam; even as ice, waxe, pitch, and other things are whitiſh when they are beaten. The durability alſo of the foam is more in an oily liquour, as in beer, &c.

L *Ice is water hardened together with cold.*

LI *Watery impreſſions are images of clouds, of birds flying over, of men, of trees, and of any things objected.*

It is known, that water is the firſt mirrour, receiving the images of all things: which is by reaſon of the evenneſſe of its ſuperficies. For light coloured with things falling upon the water, cannot (as it comes to paſſe in another body of a rough ſuperficies) be diſperſed, but by reaſon of its exceeding evenneſſe is intirely reflected, and preſents it ſelfe whole with that image to the eye of the beholder. This is the ground of all mirrours. But let us come to reall *concretions* in the water.

LII *The ſaltneſſe of the ſea, is from the ſubterrane fire, which heating a bituminous matter, ſpreadeth ſalt exhalations through the ſea.*

Salt-

Saltneſſe ſomething bitter, with a kind of oleoſity was given to the ſea. 1 That the waters might not putrifie. 2 For the more convenient nutriment of fiſhes. 3 For ſtrength to bear the burdens of ſhips. Now the ſea is ſalt, not (as *Ariſtotle* thought) by reaſon of the ſun beams, extracting the thinner parts of the waters, and ſcorching the reſt. (For our fire would do the ſame, and the ſun in lakes and pooles, neither of which is done: yea, by how much the more, ſalt water is heated with our fire, the ſalter it is; but freſh water is ſo much the freſher) but by reaſon of the heat included within the bowels of the earth, and of the deep; which when it cannot exhale, it ſcorcheth ſharply the humour that there is, ſo that it turnes to urine: The very ſame we ſee done in our own body (and all living creatures) For urine and ſweat are alike ſalt.

LIII *Spring waters are made of vapours condenſed in the cavernes of the earth; after the ſame manner, as drops are gathered together upon the covers of pots.*

It is certain that under the earth there lies a great deep, *Gen.*7. 11. That is a mighty maſſe of waters, diffuſed through the hollows

hollows of the earth; which that it joynes with certain gulfes of the Ocean, this is an argument that the depth of the sea in some places is altogether insearchable. Therefore as vapours ascend out of the open sea into the air, which being resolved into drops distill rain: so the subterrane waters, being attenuated by the subterrane heat, send forth vapours, which being gathered together in the hollowes of the earth, and collected into drops, flow out which way [passage] is given them. And this is it which the Scripture saith, *All rivers enter into the sea, and the sea runneth not over: unto the place from whence the rivers come they returne, that they may flow again. Eccles.* 1. *v.*7. Whence it is understood *why springs yield fresh water*, though they come from those bitter, and salt waters of the sea? namely, because they come by distillation to the spring head. For they say, that the sea water being distilled (that is resolved first into vapours, then into drops in an Alembick) looseth its saltnesse: by the same reason then the deep under ground, evaporating salt waters sendeth them fresh out of fountains nevertheless. And what need words? For clouds gathered of the vapours

of

of the sea: send down fresh showers. See how excellently the truth of things agreeth with it selfe still.

LIV *Medicinall Waters are made of the various tinctures of the metals and juices of the earth, (from which they receive the virtue of healing and savour.)*

For example, hot waters or baths, are made of bitumen burning within: Therefore they exhale sulphur manifestly; but sharpish waters relish of iron, coper, vitriol, allom, &c. of which earthly concretes it will be now time to speak.

Of earthly concretes, which are called Minerals.

LV *Minerals are earthly concretes begotten of subterrane vapours; as clods, concret juices, metals, and stones.*

These are called minerals from the Hebrew מִן and אֶרֶץ as if you should say *from the earth.* They call them also *Fossiles*, because they are digged: that all these are begotten of subterrane vapours, and subterrane fire, appears by the example of our body: wherein *bloud, choler, flegme, melancholy, urine, spittle, fat, flesh, veins, nerves, membranes, gristles, bone, &c.* yea, *the stone and gravell*, are made of the vapours of food

food concocted and digeſted as: ſhal be ſeen hereafter. Now as theſe parts of ours are formed within the body by the heat included; ſo minerals are generated in the bowels of the earth, not elſewhere. For the earth with its moſt deep paſſages and veins winding every way, where infinite vapours are generated, and perpetually diſtilled in a thouſand faſhions, is that great work-houſe of God, wherein, for the ſpace of ſo many ages, ſuch things are wrought, as neither art can imitate, nor wit well find out.

LVI *Clods are digged earths, infected only with fatneſſe, or ſome colour, and apt to be ſoaked, as* 1 Clay. 2 Marle. 3 Chalk. 4 Red earth. 5 Paintings, or painters colours, (*as lake, vermilion, oker, azure, or blew, verdigreaſe.*) 6 Fullers earth in Greek, ῥύπτις. 7 Medicinall earth, as ſealed earth, *Lemnian, Armenian, Samian, &c.*

Theſe colours ſeem to be nothing elſe, but the ſoot of the ſubterrane fumes, variouſly diſtilled; and thoſe earths, nothing elſe but a various mixture of liquors diſtilled alſo variouſly, and brought to ſuch or ſuch a quality.

LVII *Concrete juices, are foſſiles imbued with*

with a ſavour, or ſome ſharp virtue, apt to be diſſolved, or kindled; as ſulphur, niter, ſalt, allome, vitriol, arſenick, (which painters call orpiment) antimonie or ſtibium, *& ſuch like.*

N. Thoſe juices ſeem to be nothing elſe but *the cream* of ſubterrane liquors variouſly diſtilled.

LVIII *Metals are watery foſſiles, apt to be melted, caſt, and hammered*: as gold, ſilver, braſſe, (or copper) iron, tin, lead, quick-ſilver.

N. 1. That they are progenerated of fire, this is enough to teſtifie, that they are oft times taken hot out of the veines, ſo that the touch will not endure them. For in winter when all herbs are white with froſt, thoſe which grow over the veins, admit of no froſt, becauſe of the hot exhalation within hindering concretion, ſo alſo trees, by the blewneſſe of their leaves, ſhew the veines of metals.

2 Now that metals are made of vapours, this is an argument that they are wont alſo to be procreated in the very clouds. For examples are not unknown, even in our age of bodies of braſſe, or iron, of no ſmall weight falling from heaven.

3 That metals are made of watery vapours,

pours their liquabilitie shews; now they are coagulated by virtue of salt. Therefore the drosse of iron is salt and bitter.

4 Quicksilver alone is alwayes liquid, never consistent; as a perpetuall witnesse of the watery nature of metals. Other metals swim upon it, because it hath the most compacted substance of all, gold only excepted: which therefore it receives only into it selfe.

5 Whether metals differ in their species, or only in degree of purity and hardnesse, and in heat, we leave now in suspense.

LIX *Stones are earthly fossiles, hardly compacted, apt only to be broken in pieces.*

That stones are earth coagulated with water and fire, bricks and pots teach us; for here art imitates nature. Yet the severall formes of stones shew, that they are not earth simply concrete, but a masse concrete of divers most grosse earthly vapours, with a various temperature of humours.

LX *Stones are either vulgar, or precious.*

LXI *A vulgar stone is earth most hardly compacted: the principall kinds of which are seven.* The gravell stone, the milstone, the pumice-stone, the flint, (to which I refer the *Smiris* wherewith glasse is cut,

and iron polished the whetstone, and the touch stone, (or *Lapis lydius*) the marble, and the loadstone.

N. Every kind have their differences a-gain.

2 A great stone is called *saxum or a rock*, a little one, *gravell and sand*.

3 Most mountains are stony, (and yield metals;) because the subterrane fire (on the third day of the creation) swelling the earth here, made it self many channels and passages, breathing through which, it doth variously exhale, melt, mix and boile the matter: which is not done so copiously under plains.

LXII *Pretious stones are are called* gems, *because they are* the gums *of stones sweating in the bowels of the earth.*

Hence comes their clearnesse and brightnesse, that is to say, from their most thin and accurate straining, even more then in the gums of trees; for wood hath looser pores then stones.

LXIII *All gems are transparent, and pellucid: but some onely transparant, as these three; the Diamond, the Chrystall, the Beryll. Others coloured with all, and those* (according to the diversity of their colours) *of seven sorts.*

1 *Bright and burning*; the Carbuncle the Chalcedon, the Chrysolite.

2 *Yellow*; the Jacinth and Topaze.

3 *Green*; the Emerald, and the Turquois.

4 *Red* or *purple*: the Rubie and the Granate: but the Carneolus and the Onyx are more pale.

5 *Skie-coloured*; the Saphir, and the Amethyst,

6 *Black*; the Morion

7 *Changeable*; as the Jasper, the Agat, the Chrysoprase.

N. 1. That Chrystall is never found unlesse it be Hexagonall, which is the miracle of nature. And that it is growes in arched cels under ground, dry and closed, where the wind enters not for some years, hath been experienced at *Kings Itradeck* in *Bohemia*, *Anno* 1618. For elegant chrystals were found hanging from the stones of the arches, like *Isicles* of an exact Hexagonall forme, but in the silver mines of *Catteberge*, there are found far more. Of other gems we have nothing to say in particular.

N. 2. Stones that are wont to grow in some living creatures, are usually reckoned

ned amongſt precious ſtones: as the *pearl*, in ſea ſhell fiſhes: *the Bezoar. the Chelidonius, the Alectorius, the Bufonites, &c.* alſo *Corall*, and *Amber*. But theſe two, are to be referred rather to the following chapter.

LXIV *The virtue which is in minerals, is called* their naturall ſpirit: *of which there are ſo many formes, as there are ſpecies of minerals.*

For there is one *ſpirit of ſalt*, another, *of vitrioll, loadſtone, and iron, &c.* which diſtillers know how to extract.

CHAP. IX.

Of Plants.

THus much of Concretes: here follow Plants, which beſide their figure have life.

I *A plant is a vitall concrete, growing out of the earth: as a tree and an herb.*

Some concretes (ſtars, meteors, minerals,) want life, and lie or tarry where they were concrete: but plants endued with an inward vigour, break out of the earth, and ſpread themſelves *in plano*: whence alſo they were called plants.

II *Plants are generated, both to be an ornament to the earth, and to yield nouriſhment, medicine, and other uſes to living creatures.*

For what a ſad face the earth would have if it were not cloathed every year with thoſe diverſe coloured tapiſtries of herbs, we have ſufficient experience in Winter, and whence ſhould living creatures have food, medicines, and pleaſures, if we were deſtitute of the roots, leaves, ſeeds and fruits of plants? not to ſpeak of the commodity of ſhade, and of the infinite uſes of wood.

III *The eſſentiall parts of a plant are,* the root, the trunk *(or ſtalk)* and the branches *or* leaves.

N. W. The Elements, vapours, concrete things, conſiſted only of *ſimilar* parts: for every part and particle of water, earth, vapour, a cloud, iron, &c. is called, and is water, earth, vapour, a cloud, iron, &c. But more perfect bodies, (of plants and living creatures) do conſiſt of *diſſimular parts that is members)* every one of which hath both its office, and its name, differing from the reſt. For example. In a plant, *the root* is the part ſticking in the ground, and ſucking in the juice of the earth: *the truk*,

(or ſtalks) attracting the juice, concocting it: and ſending it to the upper parts: the *boughes and branches*, are twigs, diſtributing the juice yet better concocted, to make ſeed and fruit: *the leaves* are the coverings of the fruits and boughes.

IV *The Spirit of a plant is called a vegetable, or vitall ſpirit; which puts forth its virtue three manner of wayes; in nutrition, augmentation, and generation.*

For here that univerſall ſpirit, (the ſpirit of life,) begins more manifeſtly to put forth its virtue, preparing a portion of matter ſo ſoftly to its turn, that it may have it tractable to perform the offices of life: and is therefore called vitall in plants, namely, becauſe of its more manifeſt tokens and effects of life. They call it alſo the *vegetative ſoul*

V *Nutrition is an inbred virtue in a plant, whereby ſucking in juice fit for it, changeth it into its own ſubſtance.*

For becauſe the encompaſſing air dries up every body, and the heat included in a living body doth alſo feed upon the inward moiſture; it were impoſſible that a plant ſhould not preſently fade away, unleſſe new matter and vigour were continually ſupplyed with

freſh

freſh nouriſhment, to make up that which is loſt. and to this end every plant hath a body, either hollow, or elſe pithy, and porous, that the nouriſhing vapour may paſſe through and irrigate all the parts; yea whatſoever is in a plant, even the very haire or downe, is hollow and porous. Therefore in a man, the head is eaſed, when the haire is cut; becauſe the fuliginous vapours of the braine, or the ſuperfluities under the skin, do the more eaſily evaporate. For the ſame cauſe every plant reſts upon its root, that ſucking the moiſture of the earth through the ſtrings thereof it may be nouriſhed: therefore it periſheth when it is pluckt up. the *humour* then, or *fat juice of the earth*, is a fit nouriſhment for plants: not dry earth, becauſe it cannot paſſe through the ſtrings and pores of a plant; nor water alone, becauſe it cannot be concrete into a ſolid body. Therefore the moiſture of the earth which is a mixture of Mercury, ſulphur and ſalt nouriſheth plants.

VI *Augmentation is a virtue of a plant, whereby it increaſeth alſo by nouriſhing it ſelf, which we call by a common terme growing.*

It is pleaſant to contemplate what it is to grow, and how it is done Now it is eaſily

found out by the doctrine of motions already delivered. For first, when the spirit included in the seed, begins to diffuse it self, and to swell by reason of the heat that is raised, the thin shell of the seed must of necessity break: *by the motion of cession.* and because every body is moved towards a greater company of its connaturals, that vapour comming forth when the seed is warmed, tends towards heaven; but because the matter of the seed is fat and glutinous, the vapour being infolded therein carries it upwards with it, and brings it forth out of the earth, and *this is the originall of the stump and bough's* now because that the outside of the plant hindereth the vapours ascending, there is a strife, and heat is raised, whereby the superficies of the small body is by little and little mollified, that it may yield and rise up. and this is done every day when the Sun is hot: but the tender parts which grow up are condensed and made solid with the cold of the night: by which successions of day and night the plants take increase, all spring and summer long. Now look how much moisture is every day elevated upward by the stump, so much again succeeds it by the *motion of continuitie.* least there should be a

vacuum

vacuum. but becauſe every body loves an *aquilibrium*, and plants own their center in the joynt of the ſtump and root, it comes to paſſe by *the motion of libration*, that as much as the boughs ſpread themſelves upwards, ſo much the roots ſpread downwards or ſideways.

Now there is a qneſtion, *why when a leafe or a bough is pluckt off, yea when the ſtock is cut aſunder, the ſpirit doth not exhale, but containes it ſelf, und growes ſtill?* Anſwer 1 Becauſe the ſpirit hath its proper ſeat fixed in the root, which it doth not forſake, though a paſſage be open through a wound received: nay more, fearing diſcontinuity, it gathers and conglobates it ſelf, when it perceives an opening and danger of diſſipation. 2 Becauſe the wound is preſently overſpread with the moiſture of the plant, which being hardened with the outward cold, covers the wound as it were with a cruſt, and prohibits a total expiration.

VII. *Generation is a virtue of a plant, whereby it gathers together and conglobates its ſpirit into a certain place of it; and makes a ſeed or kernell,* (from which the like plant may afterwards grow.)

The ſpirit of the plant foreſeeing as it

vvere

were, that it shall not always have matter at command, which it may vegetate, turns but a part of it self into the nourishment of the plant, and gathers together the rest into a certain place (usually in the tops of plants) and makes *a seed* or *kernell*. *Now the seed* (kernell or graine) *is nothing else, but the image of the whole plant, gathered together into a very small part of the matter*; from whence, if need be, the same plant may be produced again: as we see done. *N. W. That herbs are bred nevertheless without seed, by virtue of the spirit infused into the elements.* 1 The command of God proves, *Gen.* 1. *v.* 11. *Let the earth bring forth, &c.* which is yet in force. 2 Experience. For if you uncover the earth beneath all roots and seeds, yet in the years following when it hath been somewhat oft watered with rain water, you shall see it bud forth. which is a notable argument of the spirits being diffused every where, but especially descending with the Sun and raine.

VIII. *The outer, and inner bark, leaves, shells, downe, flowres, prickles,* &c. *are integrating parts of plants: serving to defend them, and preserve their seeds from the injurie of heat and cold.*

IX. *The*

IX. *The kernels are for the most part encompassed with a pulp for their thinner nourishment, and to defend them from injury, but yet this pulp when it is come to ripenesse, serves for food to living creatures; as it is to be seen in Apples, Peares, Cherries, Plummes,* &c.

X. *The proprieties of plants are,* varietie, heat, and tenacity *of their spirit.*

XI. *The variety of plants is so great, that the number can scarce be counted by any means.*

The natural spirit in meteors and minerals makes certain species, and those easie to be counted, (as we see;) but the vitall spirit doth so diffuse it self, that the industrie of no man is yet sufficient, to collect the the species of herbs, and trees.

XII. *The cheif kinds of plants are herbs, trees, shrubs.*

XIII. *An herb is, that which growes and dies every year*

XIV. *A tree is, that which rising up on high, growes to wood, and continues many years.*

XV. *A shrub is of a middle nature; as the alder, the vine.*

N. W. 1. Some trees live for many ages: to wit, such as have a compacted and glutinous

nous substance, as the oak, the pine, &c. vvatery and thin plants, do soon grow and soon vvither; as the sallow, &c. 2 Some lose their leaves every year, namely, those that have a vvatery juice: others keep them as trees of a rozenous nature. 3 Trees are either fruitful or barren: the first bear either *Apples* or *Nuts*, or *fruit like unto Pine Apples*, or *Berries*. 4 Porositie and airynesse is given to the vvood of trees, by reason of which they do not sinke, and that. 1 That they might take fire. 2 That they might the more easily be transported any vvhither through rivers. 3 That ships might be made of them. Also *clammines se* or *indissipability* vvas given them, that they might serve for the building of houses: for vvhich end also their talnesse serves.

Other differences of plants may be seen elsewhere.

XVI. *All plants are hot by nature; but in proportion to our heat, some are called cold.*

For generation is not done but by heat; but that vvhich is below the degree of our heat, seemes cold to us. As for *Hemlock*, *Opium*, &c. they do not kill vvith cold, but vvith the viscosity of their vapours, vvhich

fill

fill up the cavities of the brains, ſtop the Nerves, and ſo ſuffocate the ſpirit: the ſame may be ſaid of all poiſonous things.

XVII *Vitall ſpirit* (as alſo naturall) *holds ſo faſt to its matter, that it ſcarce ever forſakes it.*

This is demonſtrated (beſides that we ſee the ſpirit every year to be driven by the cold of winter out of the ſtocks, and to be hidden in the root: and to put forth it ſelfe again at the beginning of the ſpring) by four examples.

1 That how ever the matter of fruits or herbs be vexed, yet the ſpirit conteins it ſelfe: as it is to be ſeen in things, ſmoaked, toſted, roaſted, ſoaked, pulverized, &c. which retein their virtue.

2 That being driven out of the better part of the matter, by the force of fire, yet it ſticks in the portion that is left, and there it is congregated, and inſpiſſated; ſo that it ſuffers it ſelfe to be thruſt together into a drop, or a little poulder, rather then forſake the matter: as it appears in *diſtilled waters*, which therefore they call *ſpirits*.

3 That when its matter is ſomewhat oft diſtilled and transfuſed into divers formes through divers Alembicks, yet it doth uot fly away

away. For example, when a goat or a cow eats a purging herb, and the nurse drinks her milk (or the whey of her milk) it comes so to pass, that the infant that sucks her will be purged.

4 And which is more, it doth not onely retein a virtue of operating: but also of augmenting it selfe, and forming a creature of its kind: which may be shewn by two examples. *Sennertus* relates, that *Hieremy Cornarius* caused a water to be distilled in *June*, *Anno* 1608. and that in the moneth of *November* a little plant of that kind was found at the bottome of the glasse, in all points perfect. But *Quercetanus* writes that he knew, A *Polonian* Physician, that knew how to pulverise plants so artificially that the poulder as oft as he listed would produce the plant. For if any one desired to have a rose or a poppy shewed him, he held the poulder of a rose or a poppy inclosed in a glasse over the candle that it might grow hot at the bottome; which done, the poulder by little & little raised it self up into the shape of that plant, and grew, & represented the shape of the plant, so that one would have thought that it had been corporeall: but when the vessell was cold sunk again into poulder. Who sees not here that the

spirits

ſpirits are the formers of plants? who ſees not that they inhere ſo faſt in their matter, that they can as it were raiſe it again after it is dead? who ſees not that the ſpirit of a minerall or a plant is really preſerved in the forme of a little water, oile, or poulder? Thus the eternall truth of that ſaying is mainteined. *And the Spirit of God moved it ſelfe upon the waters.* As for the ſpirit of a living creature, whither it may be preſerved after that manner, and raiſed up to inform a new body, we leave it to be thought of: purpoſing nevertheleſſe to ſpeak ſomething of it towards the end of the next Chapter.

CHAP. X.

Of living creatures.

THus much of plants; here follow living creatures.

I *A living creature is a moving plant, endued with ſenſe:* as a worm, a fiſh, a bird, a beaſt.

For if a ſtone or an oak could move it ſelf freely, or had ſence, it would be a living creature alſo.

II *The principall difference betwixt a living creature and a plant, is* αὐτοκινησία, *that is*

is a free moving of it ſelfe to and fro.

For the better to expreſſe the power of the ſpirit of life, Gods Vicar in creatures, it was needfull that ſuch bodies ſhould be produced, which that ſpirit inhabiting, might have obedient unto all actions. Now ſeeing that the ground of action is motion, bodies were to be framed, which might performe a free motion; and theſe are called *Animalia* or *Animantia*, living creatures, from the ſoul which powerfully evidences life in them. 2 Therefore mobility is in all living creatures, but after divers manners. For ſome move only by opening and ſhutting, not ſtirring out of their place; as oiſters and cockles. Others creep by little and little, as ſnailes, earth-wormes, and other wormes: ſome have a long body which creeps with winding it ſelfe about, as ſnakes: ſome have feet given them, as lizards, beaſts, birds: but theſe laſt have wings alſo to flie through the air. Which fiſhes do imitate in the water, performing their motion by ſwimming.

III *The moving principle in a living creature is the* vitall ſoul: *which is nothing elſe but the ſpirit of life, thick and ſtrong, mightily filling, and powerfully governing the bodies which it inhabiteth.* IV *The*

IV *Now because a voluntary and a light motion cannot be performed, but in a subtle matter, living creatures have bodies given them far more tender then plants, but far more compound. For they consist of spirit, flesh, blood, membranes, veins, nerves, gristles, and lastly bones, as it were props and pillars, lest the frame should fall.*

Understand this in perfect living creatures. For more imperfect living creatures in which we contemplate onely the rudiments of nature, have neither bones, nor flesh, nor bloud, nor veins: but onely a white humour, covered with a skin or crust, as it were with a sheath, which the spirit included doth stir or move; as it appears in worms, snails, oisters, &c. But to perfect living creatures. 1 That they might have a more subtle spirit, *blood and brains* were given. 2 And that these might not be dissipated, they had vessels and channels given them, *veines*, *arteries*, *nerves*, 3 That a living creature might be erected, *bones* were given him. 4 And lest the bones, as also the veins, arteries, nerves, should easily be hurt, all was covered either with *fat* or *flesh*. 5 And that the members might move, *tendons* and *muscles* were interwoven

throughout. 6 And leaſt in moving the bone, the bones ſhould wear one againſt another, & cauſe pain in the living creature; a *griſtle* which is a ſofter ſubſtance, being as it were halfe fleſh, was put between the joints. 7 And laſtly, that the frame might hang firmly together in its compoſure, it was compaſſed with a *hide*, or *skin*, as alſo all the members with their membranes. Therefore a living creature conſiſts of more ſimilar parts then a plant: but of far more diſſimular parts or members: of which it followes.

V *The bodies of living creatures were furniſhed with many members: as with diverſe organs for diverſe actions. The head indeed is the principall member of a living creature, wherein the whole ſpirit hath its reſidence, and ſhews all its force: but becauſe a living creature was intended for divers actions, it had need of beſides.*

1 Vivifying organs, ſupplying the living creature with heat, life, and motion: that is, *brains and heart.*

2 Moving organs, that is, *feet, wings, feathers*, &c.

3 And leſt one thing ſhould run againſt another, or fall into precipices, it was neceſſary to furniſh them *with ſight*; alſo

also with a quick *hearing* and *touch*.

Lastly, because the earth was not to supply nutriment immediately to a living creature, (as to a plant fixed in the earth) but it was left them to seek: there was need of *smelling and tasting*, that they might know what was convenient to their nature. Hence *eyes, ears, nostrils, &c.*

4 Now because a living creature, was not to be fixed in the ground with a root, because of his free motion, more perfect organs of nutrition were requisite: for that cause there was given him *a mouth, teeth, a stomack, a liver, a heart, veins*, &c.

5 And because they were not to spring out of the earth as plants, by reason of the same motion to and fro. *Divers Sexes* were given them to multiply themselves, and distinct genitall members.

6 And because living creatures were to be alwayes conversant with others of their own, or of a divers kind, they had need of some mutuall token, even in the dark: they had a *tongue* given them to form sounds.

7 Lastly, because it could not be, but that a living creature should sometimes meet with contraries, they had as it were shields and armes given them. *Hares, bri-*

ſtles, ſcales, ſhels, feathers: likewiſe *horns, clawes, teeth, hoofs, &c.*

VI *Therefore the whole treatiſe concerning a living creature, is finiſhed in the explication* I Of the nutritive *faculty.* II Of the vitall. III Of the ſenſitive. IV Of the loco-motive. V Of the enuntiative. VI Of the defenſive. VII *And laſtly,* of the generative.

For he that knoweth theſe ſeven, knowes the whole myſterie of nature in living creatnres. For whatſoever is in the body of a living creature, ſerveth thoſe *faculties:* if it do not ſerve them, it is in vain, and maketh a *monſter.* It is to be obſerved alſo that the firſt three faculties are governed by ſo many ſpirits. *The nutritive faculty by the naturall ſpirit, the vitall by the ſpirit of life, the ſenſitive by the animall ſpirit:* the other four by thoſe three ſpirits joyntly.

Of the nutritive Faculty.

VII Every living creature ſtandeth in need of daily food, to repair that which periſheth of the ſubſtance every day.

For life conſiſts in heat. And heat, being that it is fire, wants fuell: which is moiſt, ſpirituous, and fat matter. Heat in a living crea-

creature being deſtitute of this, ſets upon the ſolid parts, and feeds on them. And hence it is that a living creature, as well as a plant, without nouriſhment pines away, and dies. But if it be ſparingly fed, it therefore falls away, becauſe the heat feeds upon the very ſubſtance of the fleſh.

VIII That nouriſhment is convenient for a living creature, which ſupplies it with a ſpirit like its own ſpirit.

For ſeeing that life is from the ſpirit, the matter of it ſelfe doth not nouriſh life, but a ſpirituous matter. And indeed the ſpirit of the nouriſhment muſt needs be like the ſpirit of the living creature. Therefore we are not nouriſhed with the elements, as plants are; for as much as they have only a naturall, not a vitall ſpirit; but we are nouriſhed with plants, or with the fleſh of other living creatures, becauſe thoſe afford a vitall ſpirit. Nay further, there is a particular proportion of ſpirits, by reaſon of which a horſe chuſeth oates, a ſwine barley, a wolfe fleſh, &c. Nay, an hog hath an appetite to mans excrements alſo, becauſe it yet findeth parts convenient for it.

IX Nouriſhment turneth into the ſubſtance of that which is nouriſhed.

That appears 1 becauſe he that feeds on dry meats, is dry of complexion: he that feeds on moiſt, is flegmatick, &c. 2 becauſe, for the moſt part a man reteins the qualities of thoſe living creatures on whoſe fleſh he feeds, as he that feeds on beefe is ſtrong; he that feeds on veniſon, is nimble, &c. If any one have the brains of a cat or a wolfe given him to eat, he partakes the phantaſies of thoſe living creatures, &c.

X Nutriment muſt needs be aſſimilated that it may turn into the ſubſtance of a living creature.

For a thing is neither applied well, nor cohereth commodiouſly with that which is unlike to it; much leſſe that one ſhould turn it into the other. Therefore fleſh or bone is not immediately made of meat or drink: but by many gradations, as it ſhall appear.

XI Aſſimulation is made by the tranſmutation of the nouriſhment taken ſo oft iterated, till it come to the likeneſſe of the ſubſtance nouriſhed.

It is well known out of the Metaphyſicks, that all action tends to this, that the Patient may become like to the Agent, which is every where evident in naturall things,

but

but especially in the nourishment of bodies. For whatsoever is taken in, of whatsoever colour or quality, is wrought so at length, that it becomes like to that which is nourished, and is applyed to its substance: which should be diligently marked in that which follows.

XII The principall transmutation of the nourishment, is by progeneration of the four vitall humours, bloud, flegme, yellow choler, and black.

For the nourishment received, being that it is tempered together (as all the bodies of the world are) of the four elements, is resolved in the body of a living creature into four again; the fattest part of it is turned into *bloud:* a part into *spittle*, or *flegme*, a part *into yellow choler*, or *choler*; a part into *black choler*, or *melancholy: melancholy by its grossenesse represents the earth: flegme, water: bloud, air: choler, fire.* But they differ in colour and in savour; for melancholy is black and bitter; flegme, white and without taste: bloud, red and sweet: choler, yellow and bitter. Now it is to be noted, that amongst these four, bloud is most copiously generated, because it conteins the very substance of the nourishment: to which

yellow choler addes onely a more easie penetrating through all: but black choler fixeth it again, and applieth it to the members: Lastly, flegme tempers the acrimony of them both, lest they should corrode with penetrating and fixing, and gently agglutinates the bloud to the members: And hence it is that Physicians also with the vulgar speak oft of the blood, as if it were the only food of life.

XIII The progeneration of vitall humours is done by concoction.

For concoction doth alter the matter by the force of heat.

XIV Concoction in a living creature is done after the same manner as distillation in Alembicks: namely, by heating of the matter, and resolution of it into vapours, and mixing the said vapours together, and by a new coagulation of them again.

For every living body is a very alembick, full of perpetuall heat and vapours. For life is heat: and heat cannot but boile the matter that is put in, and by attenuation, turn it into vapours.

XV Now in every concoction, there is a separation of the profitable parts from the unprofitable: the first are digested and assimilated, the

the other are voided and ſtreined forth.

So in Alembicks, the more ſubtle and profitable parts, (that is the more fat and ſpirituous) being reſolved into vapour are gathered again into drops: and into a thick ſubſtance: but the more groſſe and impure parts, called the dregs and excrements, ſink down, and are afterwards caſt out.

XVI Every concoction leaves behind it unprofitable dregs; which are called excrements and droſſe.

Thus we ſee it come to paſſe in the decoction of metals. *Now we muſt note that plants make little or no excrement:* becauſe they are nouriſhed with a ſimple and uniform juice, which goes all of it into their nature: or if any thing remain, it ſweats forth in gum. *But living creatures*; becauſe they conſiſt of very diſſimular parts, have need of a compound nutriment, that is ſolid and ſoft, dry and moiſt, hot and cold, &c. that ſo the more ſolid parts may have nutriment alſo whence by aſſimulation evey part draws that which will profit its ſelfe, the reſt muſt of neceſſity be ſtreined out. Another reaſon is becauſe plants are ſuſteined with a little ſpirit, and that which doth not evaporate: but living creatures

tures are full of ſpirit, (for otherwiſe ſo groſſe a frame could not be ſuſteined and weilded) and that is continually attenuated and ſpent. Therefore they have need of more ſpirit then matter for their nutriment: and when that is extracted out of the ſpirituous parts, they void forth the reſt.

XVII The principall concoction in a living creature is threefold, Chylification, Sanguification, and Membrification.

The firſt is made in the ſtomack: the ſecond in the liver: and the laſt in all the members.

XVIII Every one of theſe concoctions hath three ſorts of veſſels. 1 *of ingeſtion.* 2 *of digeſtion.* 3 *of egeſtion.*

XIX The veſſels of Chylification; were 1 *the mouth, and the throat.* 2 *the ſtomack, or ventricle.* 3 *the guts and the arſe-hole.*

For the food being received at the *mouth*, is chewed with *the teeth*, or jawes, and paſſed through the throat. It is boiled in the *ſtomack* as it were in a cloſe Alembick for ſome houres. And from thence by evaporation it paſſeth into the entrals (for the mouth of the ventricle towards the throat is ſhut up) and becometh *Chylus*, that is, a certain ferment like pap, or white broth.

For

For it takes a white colour from the ſtomack by aſſimilation. The more ſubtle parts of this *Chyle* are attracted to the liver, as a matter fit for bloud: but the excrements of this firſt concoction, are thick dregs, which are driven out by the guts and the back part, not by the ſimple motion of *Ceſſion*, but by the motion of *Antipathy*, for the naturall ſpirits placed in the fibres of the guts, ſucking forth that which is profitable, but turning themſelves away from that which is unprofitable, and hatefull to them, contract the nerves of the guts, and thruſt forward thoſe burdens towards the paſſage.

XX The veſſels of Sanguification, are 1 *the Meſenterie.* 2 *the Liver.* 3 *the Ureteres, the ſpleen, and the gall.*

For the Meſenterie encompaſſing the entrals with its ſtrings (which they call the Meſaraicall veins) ſucks the beſt part of the *Chylus* out of the entrals; and carries them to the liver by the *Vena Porta*. Now the liver concocts and ſeparates that liquour again, for it aſſimilates the ſweeter parts in colour to it ſelfe, and turns *them to bloud, ſwelling with naturall ſpirit:* with which nevertheleſſe there is flegme and yellow choler,

choler, and black mixt. The excrement of this second concoction is urine: namely, a wheaie and salt humour which floweth from the liver by the ureteres to the bladder; whence by the channell of the genitall member it is sent forth.

But because the 2d. concoction ought to be far more subtile then the first, it is not sufficient that the bloud is purged from its serosity. But both kinds of choler and flegme must of necessity also be purged from redundancy: the spleen therefore by sympathie attracts to it selfe whatsoever it perceiveth, that is too grosse and earthy in the bloud, and by little veins sends it again into the entrals, and by that means disburdens it selfe of that dreggy humour; and last of all the gall attracteth those parts of the bloud that are too sharp and fiery, (whose little bag hangs at the liver) and by strings sends them again mixt into the entrals; whence the bitternesse and ill sent of dung.

XXI *The vessels of membrification, are* 1 *veins.* 2 *every particular member.* 3 *pores.*

For the veins proceeding from the liver spread themselves over all the parts of the body like boughs, and sending forth little branches, every way end in strings that

are

are moſt tenacious; from which every member apart ſucketh, and by a ſlow agglutination aſſimilates it to it ſelfe, ſo that the bloud flowing into the fleſh, becomes fleſh, that in the bones turns into bone; in a griſtle, to a griſtle; in the brain, to brains; juſt after the ſame manner as the juice of a tree is changed into wood, bark, pith, leaves, fruits, by meer aſſimilation. The *excrements* of this third moſt ſubtle concoction are ſubtle alſo, namely *ſweat and vapour*, which alwayes breaths out through the pores. If any more groſſe humour remains (eſpecially after the firſt and ſecond concoction not well made) it breeds ſcabs; or ulcers, or the dropſie.

XXII For the furthering of nouriſhment there is a ſpur added, that is appetite, or hunger, and thirſt: which are nothing but a vellication of the fibres of the ſtomack, ariſing from the ſharp ſucking of the Chylus.

For the members being deſtitute of the juice, wherewith they are watered, ſolicite the veins of bloud: and the veins (by the motion of continuity) ſollicite the liver; the liver, the Meſenterie; that the entrals; the entrals the ſtomack: which, if it have nothing to afford, contracts and wrinkles

it

it selfe: and the strings of it are sucked dry, from whence proceeds first a certain titillation, (and that we call *appetite* simply) and afterward pain (and this we call *hunger*) and if solid meat be taken, but dry, because coction, or vaporation, cannot be made by reason of drinesse, there is a desire that moisture should be poured on, and this vve call thirst. It appears then *why motion provokes appetite? and why the idle have but little appetite, &c.*

XXIII The whole body is nourished at once together, by the motion of libration.

To vvit, after the same manner, as the root in a plant doth equally nourish both it selfe, and the stock, and all the boughes. Therefore no member nourisheth it selfe alone, but others vvith it selfe, and so all preserved. Otherwise, if any member rob the rest of their nourishment; or again refuseth it, there follows a distemperature of the vvhole body, and by and by corruption, at length death.

XXIV A living creature being thus nourished, is not onely vegetated, but also (as long as his members are soft and extensive,) *augmented, the superficies of the members, yielding by little and little, and extending it selfe; but*

as

soon as the members are hardened (after youth;) *the living creature ceaseth to grow: yet goes forward in solidity and strength, so long as the three concoctions are rightly made. But when the vessels of the concoctions begin to dry up also; the living creatures begins to wither away, and life grows feeble, till it fail, and be extinguished*

Of the vitall faculty.

XXV *Life in a living creature, is such a mixture of the spirits with the blood and members, that they are all warme, have sense, and move themselves.*

Therefore the life of living creatures consists in *heat*, *sense*, and *motion*; and it is plain: for if any creature hath neither motion, nor sense, nor heat, it lives not.

XXVI *Therefore every living creature is full of heat, sometimes stronger, and sometimes weaker.*

For every living creature is nourished. How it appears out of that which went before, the nourishment is not made but by concoction: but reason teacheth that concoction is not made but by heat and fire. It comes therefore to be explained, whence a living creature hath heat and fire? and by what means it is kindled, kept

kept alive, and extinguiſhed? which the two following Aphoriſmes ſhall teach.

XXVII *The heart is the forge of heat in a living creatu e, burning with a perpetuall fire, and begetting a little flame called* the ſpirit of life; *which it communicates alſo to the whole body.*

Hence the heart is ſaid commonly, to be the firſt that lives, the laſt that dies.

XXVIII *The vitall ſpirit in the heart, hath for its matter bloud; for bellowes, the lungs: for channels, by which it communicates it ſelfe to the whole body, the arteries.*

Our hearth fire hath need of three things, 1 matter or fuell, and that fat. 2 of blowing or fanning, whereby the force of it is ſtirred up. 3 free tranſpiration whereby it may diffuſe it ſelfe; the ſame three the maker of all things, hath ordeined to be in every living creature. For the heart ſeated a little above the liver, drinketh in a moſt pure portion of bloud, by a branch of the veins: which being that it is ſpirituous and oily, conceives a moſt ſoft flame; and leſt this ſhould be extinguiſhed, there lies near to the heart *the lungs*, which like bellowes dilating and contracting it ſelfe, blowes upon, and fans that fire of the heart perpetually,

ally, to prevent ſuffocation: Now being that that inflammation of the heart, is not without fume or vapour (though very thin the ſaid lungs by the ſame continuall inſpiration exhaleth thoſe vapours through *the throat*; and drawing in cooler air inſtead thereof, doth ſo temperate the flame of the heat, whence the neceſſity of breathing appears, and why a living creature is preſently ſuffocated if reſpiration be denied it. And that flame, or attenuated, and moſt hot bloud, is called *the ſpirit of life*; which diffuſing it ſelfe through the arteries, (that accompany the veins every way) cheriſheth the heat both of the bloud (that is in the veins) and all the members throughout the whole body. Now becauſe it were dangerous to have this vitall ſpirit deſtroyed, the arteries are hid below the veins, only in two or three places, they ſtand forth a little: that, ſo the beating of that ſpirit, (as well as of the heart it ſelfe, when the hand is laid upon the breaſt) may be noted, and thence the ſtate of the heart may be known.

Of the ſenſitive faculty.

XXIX *Senſe in a living creature is the*

per-

perception of those things that are done within and without the living creature,

XXX *That perception is done by virtue of a living spirit; which, being that it is most subtle in a living creature, is called* the Animall spirit.

XXXI *That perceptive virtue consists in the tenderness of the animall spirit: for because it is presently affected, with whatsoever thing it be wherewith it is touched.*

For all sensation is by passion; as shall appear hereafter.

XXXII *The seat and shop of the animall spirits is the brain.*

For in the brain, there is not only greatest store of that spirit residing, but also the whole animall spirit is there progenerated.

XXXIII The animall spirits are begotten in the brain, that is in bloud and vitall spirit. 2 purified with the fanning of respiration. 3 communicated to the whole body by Nerves. The excrements of the brain are cast forth by the nostrils eares, and eyes (that is by flegme and tears.)

For the strings of the veins and arteries, running forth into the brains, instill bloud and vitall spirit into them. And the bloud, that

that turns into the substance of the brains by assimilation: but the vitall spirit, being condensed by the coldnesse of the brain, is turned into the Animall spirit: which the air, drawn in by inspiration, and getting into the brain through the hollownesse of the nostrils, and of the palate, doth so purifie with fanning every moment, that though it be something cold, yet it is most moveable, and runs through the nerves with inexplicable celerity. Now the *Nerves* are, *branches or channels, descending from the brain through the body.* For the marrow of the back bone, is extended from the brain all along the back of every living creature: and from thence divers little branches run forth, conveying the animall spirit, the architect of sense and motion, to all the members in the whole body.

XXXIV To know the nature of the senses three things are pertinent, 1 *the things requisite.* 2 *the manner.* 3 *the effect.*

XXXV The things requisite are 1 *an object.* 2 *an organ.* 3 *a medium to conjoyn them.* Or *Sensile, Sensorium, and the Copula.*

XXXVI Objects are sensible qualities inhering in bodies; Colour, Sound, Savour, Tangor.

For nothing is seen, touched, &c. of it selfe, but by accidents wherewith it is clothed. And if we would be accurate Philosophers, *N. W.* of the three principles of things, only light or fire is preceptible. For matter and spirit are of themselves insensible: *the light then tempered with darknesse, makes the matter visible. Motion*, (which is from light) *makes a sound*; *but heat* (which is from motion) *stirs up and temperates the rest of the qualities, odours, savours, tangors.*

XXXVII *The organs of the senses are parts of the body in which the animall spirit receives the objects that present themselves*; namely, *the eye, the eare, the nostrils, the tongue, and all that is nervie.*

Nothing in all nature acts without organs: therefore the animall spirit cannot do it neither.

XXXVIII *The medium of conjoyning them, is that which brings the object into the organ: in sight, the light*; *in hearing, the air moved with breaking: in smels, the air vapouring: in taste, the water melting: in touch, the quality it selfe inhering in the matter.*

XXXIX *The manner of sensation is the contact of the Organ with the object, passion, and action.*

There

There is but one ſenſe to ſpeak generally, and that's the Touch. For nothing can be perceived, but what toucheth us either at hand, or at a diſtance. There is no ſenſe at all of things abſent.

XL *Therefore in every ſenſation the Animall ſpirit ſuffers by the thing ſenſible.*

That there is no ſenſation but by paſſion is too evident. For we do not perceive heat or cold, unleſſe we be hot or cold; nor ſweet and bitter, unleſſe we become ſweet or bitter; nor colour, unleſſe we be coloured therewith. Our ſpirit, I ſay, reſiding in the organs, is touched and affected. Therefore thoſe things which are like us, are not perceived: as heat like our heat, doth not affect us. But we muſt obſerve that the Organs, that they may perceive any qualities of the objects, want qualities of themſelves; as the apple of the eye, colour; the tongue, ſavour; &c.

XLI *Yet in every ſenſation the animall ſpirit doth reach upon the thing ſenſible: namely, in receiving, ſpeculating, & laying up its ſpecies.*

For the Animall ſpirit reſident in the brain, what ever ſenſorie it perceives to be affected, conveys it ſelfe thither in a moment to know what it is: and having per-

ceived it, returns forth with, and carries back the image of that thing with it; to the center of its work-house, and there contemplates it, what it is, and of what sort: and afterward layes it up for future uses, hence the Ancients made three inward senses.

1 *The common sense*, or attention.

2 *The Phantasie*, or imagination.

3 *The memory*, or recordation. But these are not really distinct: but onely three distinct internall operations of the same spirit. Now that those inward senses are in brutes, it appears, 1 Because if they do not give heed, many things may and do usually slip by their ears, eyes, and nostrils. 2 Because they are endued with the faculty of imagining or judging. For doth not a dog barking at a stranger, distinguish betwixt those whom he knowes, and strangers? yea sometimes a dog or a horse, &c. starts also out of his sleep: which cannot be but by reason of some dream. And what is a dream but an imagination? 3 Because they remember also, for a dog that hath been once beaten with a cudgell, fears the like at the sight of every staffe, or gesture, &c. And therefore it is certain, that

every

every living creature, even flies and worms, do imagine. But of the inward senses, more at large, and more distinctly in the Chapter following.

XLII *The effect of sensation is pleasure, or grief.*

Pleasure, if the sense be affected gently and easily with a thing agreeable thereto, with titillation; griefe, if with a thing that is contrary to it, or suddenly with hurt to the Organ.

XLIII *And that the Animall spirit alwayes occupied in the actions of sense, may sometimes rest, and be refreshed, sleep was given to a living creature*; which is *a gathering together of the animall spirits to the center of the brain, and a stopping of the Organs in the mean time, with the vapours ascending out of the ventricle.*

Hence it appears. 1 *Why sleep most usually comes upon a mans after meat?* or else after wearinesse, when the members being chafed do exhale vapours? 2 *Why carefull thoughts disturb sleep?* that is, because that when the spirit is stirred to and fro, it cannot be gathered together, and sit still. 3 *What it is to watch, and how it is done?* namely, when the spirit being strengthened

in it selfe, scatters the little cloud of vapours already attenuated, and betakes it selfe to its Organs. 4 *Why too much watching is hurtfull?* because the spirits are too much wearied, weakened, consumed, &c.

Thus much of the Senses in general, somthing is to be said also of every one in particular.

XLIV The touch *hath for its instrument the nervous skin: as also all the nervous, and membranaceous parts of the body.*

Therefore haires, nailes, bones, do not feel, &c. though you cut or burn them: because they have no nerves running through them. Yet they feel in that part, where they adjoyn to the flesh, because they have a nervie substance for their gluten. Hence the pain under the nailes, and membranes of the bones, is most acute. Now being that *the skin* of the body is most glutinous, and altogether nervie, lest it should put the living creature to continuall pain and trouble, by being too sensitive, it is encompassed with a thin skin, called in Latine, *Cuticula* (which we see come of somtimes in members that are scorched and bruised) and void of sense, to restraine the violence of the sense.

The

XLV The taſte *hath the tongue for its Organ, a porous member, and alwayes moiſt, that ſo dry things alſo that touch it, may melt and give forth a ſavour, which penetrating the tongue by the nerves placed at the roots thereof, is by and by communicated to the brain.*

When the tongue is dry (as in great thirſt) the taſte perceives nothing; and therefore God hath in his wiſe counſell provided, that in every perfect living creature, the vapours exhaling out of the ventricle, ſhould be gathered together into ſpittle within the concavity of the mouth, and ſhould water the tongue perpetually: for which purpoſe the poroſitie of the tongue ſerves very wel. Yet there were added over and above two little kernels, called *Tonſillæ*, ſpongious too, alwayes preſerving ſpittle for the uſe of the tongue.

XLVI *The noſtrils are the Organs of ſmelling, and that cribrous bone placed over them; by which as through a ſponge, the ſmell comming from things may enter the brain.*

Therefore when the *Catarrhe* flowes and fils the noſtrils, ſmelling is hindred. This is the moſt open way to the brain, and therefore moſt powerfull to affect the animall ſpirit, either immediately pleaſing, or recre-

recreating or ſtrengthning it, or moleſting and ſuffocating it. For hence it is, that groſſe, fuliginous, impure vapours kill: but ſharp ſmells raiſe a man, even out of a deep ſwoone.

XLVII. Hearing *hath the ear for its Organ; which containes the hole to the brain, together with a griſtly border winding about like the ſhell of a ſnaile, adjoyned without to receive the motion of the aire when in is ſtricken, and turne it inward: but within at the center of the windings is a little drum, with a little bit of fleſh ſtanding by it, like a hammer; which being beaten with the aire that enters, beats the drum alſo, which the ſpirit perceiving, judges of the greatneſſe or ſmalneſſe, nearneſſe or diſtance of the thing beaten with the aire: and by multiplied experience, knows what it is that moves the aire, and of what ſort.*

This wonderful Organ is eaſily corrupted within and without. Within, if the paſſages be ſtopped with fiegme: & much more if the hammer or the drum be hurt with rottenneſſe. But without, if the ear, (that is that griſtly border) be cut off: for then the ſound ſlips by the ear, or being received in ordinately, makes only an inordinate noiſe. To help which the Creator gave living creatures two ears apiece.

tures

Now it appeares hence, 1 *Why too ſharpe or too dull ſounds offend, the temperate pleaſe us*? becauſe they agree better with our ſpirit.

2. *Why a ſound penetrates obliquely alſo*? becauſe the aire moved, moves that which is next it round about by the motion of diffuſion.

3. *Why a ſound ſpread round about, failes by little and little*? becauſe it is juſt as when the water of a poole is moved with a ſtone falling into it. Excepting that the water quivers a good while in that whole circle: but the circle of the rain moved, paſſeth away together and at once: for the ſound of a bell, doth not ſticke in the aire, but is wheeled about in the ſounding bell.

4. *Why when one hears all hear the ſame*? becauſe a ſound is a real commotion of the aire, which arrives at the ears of all thoſe that are within that circle.

5. *What the Echo is*? namely a ſound reflected from hollow places: after the ſame manner as the circulations of the water made in a veſſel, after they have been at the ſides, returne again toward the center.

XLVIII. *The ſight hath the eye for us Organ; which is nothing elſe but a hollow look-*

looking glaſſe, receiving into it ſelf the images of ſuch things as preſent themſelves, and tranſmitting them to the brain to be judged of.

The fabrick of the eyes is admirable. For beneath the fore-head of every living creature, God hath hollowed out in the skull two windows, into which the outmoſt membrane of the brain, ſends two things like bags, filled with the humorus that come from the braine. In the midſt of which there is a pipe woven together of an opacous thin membrane, yet full of a moſt pure chryſtalline humour: they call it the *apple of the eye*, in which viſion is properly made, this is encompaſſed with a net-work, full of a watery or glaſſie humour: And laſt of all, that membrane which the common ſort call the *white of the eye*; but Philoſophers (becauſe it is hard and poliſhed over like a horne) call *cornea*, and this is tranſparent over againſt the apple and the net-work, elſewhere it retaines its whitneſſe. Now under the root of the apple lies the *optick nerve*, by which the image of the thing perceived, paſſeth ſtraight to the center of the braine.

XLIX. *No viſion is without the miniſtery of light; for that reflecting from things and coloured with their aſpect diffuſeth it ſelf every way*

way, and whereſoever it falls upon a glaſſe, it impreſſeth the image of the ſaid things.

Whence it appeares: 1. *Why only things that are coloured are ſeen?* becauſe the light muſt of neceſſity rebound to the eye, but that which hath no colour is tranſparent as the aire, *&c.*

2. *Why thoſe things that are to be ſeen muſt of neceſſity be enlightned?* becauſe ſight is the reſiliencie of the light from the object to the eye.

3. *Why the eye placed in the ſhade or in the dark ſees the ſtronger?* becauſe it receives the light reflected without any impediment. For if the eye it ſelf be enlightned alſo the light reflected from it, meets with the other light (coming from things) and ſo there is a colliſion and a diſſipation of them both.

4. *VVhy we ſee nothing, if there be any thing betwixt the eye and the object?* becauſe the reflexion of the light is not made but in a right line.

5. *VVhy ſome living creatures ſee beſt in a ſtrong light, others in an obſure light?* becauſe the lucidity of the animal ſpirit is diverſſly proportionated. So Spiders and Flies ſee the ſmalleſt things, which paſſe our ſight,; (and much more the ſight of an horſe or an ele-

elephant, &c.) becauſe there are more ſubtile ſpirits in a more ſubtile body.

6. VVhy whiteneſſe diſgregates the ſight, and if it be overmuch, diſſipates and corrupts it? becauſe it is the very light it ſelf reflecting, whoſe nature is to penetrate, attenuate, part aſunder and diffuſe the object. For to that end it was ſent into the world.

L. *Viſion is three-fold, ſtreight, reflected, and refracted.*

Right or direct viſion is that whereby the light is ſeen, ſuppoſe the Sun or fire: For here the light offers it ſelf to the eye by a ſingle line.

Reflected is, that whereby other things are ſeen in a free aire: for there the light reflected from things, comes to the eye by a ſecond line (for by the firſt line the light falls upon the object, by the ſecond from thence upon the eye.)

Refracted is that whereby things are ſeen through a double medium, and ſo by refracted lines: as when an oare or pole ſeems broken in the water. Alſo when a piece of mony in the bottome of a veſſel full of water, ſeemes bigger and nearer the ſuperficies, ſo that one may go back and ſee it.

Of the motive faculty.

L I. *Motion was given to a living creature.*

1. *To seek his food.*

2. *For those actions to which every one is destinated.*

3. *To preserve the vigour of life.*

For a living creature being of a more tender constitution then a plant, would more easily putrifie and perish, if it were not quickned by most frequent motion. Therefore the Creator hath most wisely provided for our good, that we cannot so much as take our meat without labour and motion.

L II. *The moving principle is the animall spirit.*

Therefore a body without life, though never so well furnished with Organs, moves not: and when the braine, the seat of the animall spirits is ill affected (for example either with giddinesse or a surfet) the members presently fall, or at least stumble and totter. And when the nerve of any member is stopped, it is presently deprived both of motion and sense; as may be seen in the palsie and apoplexie.

L III. Now

LIII. *Now the animall ſpirit moves either it ſelf only, or the vitall ſpirit with it: or laſtly the members of the body alſo.*

LIV. *The animall ſpirit moves it ſelf perpetually, ſometimes more, ſometime leſſe: namely, running out and into the Organs of the ſenſes: or howſoever ſtirring it ſelf in its work-houſe.*

For from this inward motion of it, are perpetual phantaſies or imaginations even in ſleep; which then we call dreams.

LV. *It carries the vitall ſpirit along with it, when at the ſenſe of ſomething, either pleaſing or diſpleaſing, it conveyes it ſelf to and fro through the body, taking that with it as it were to aide it; as it is in joy and ſorrow; hope and feare; gratulation and repentance; and laſt of all in anger.*

For *joy* is a motion, wherein the ſpirit poureth forth it ſelf at the ſenſe of a pleaſant object, as though it would couple it ſelf with the thing that it deſireth. Thence that lively colour in the face of a joyful man from the vital ſpirit, flowing thither with a moſt pure portion of the blood. And this is the cauſe why moderate joy purifies the blood, and is helpful to prolong life. See *Prov.* 15. *v.* 13. & 17. *v.* 22.

Sorrow

Sorrow is a motion, whereby the vitall ſpirit at the ſenſe of an object that diſpleaſeth it, runnes to its centre; the heart as it were feeling a hurtful thing, thence paleneſſe in the face of thoſe that are affrighted, and ſtiffneſſe of the skin and haires; hence alſo danger of death, if any one be often and greatly affected with ſorrow: the like motions are in *hope and fear, joy and ſorrow*; that is, in the ſenſe of good or bad, either preſent or paſt.

But *anger*, is a mixt motion, whereby the ſpirit for fear of injury flies to the center, and thence poures forth it ſelf again as it were in revenge. Hence they that are angry, are firſt pale, and afterwards red, *&c.*

N. W. All theſe motions commonly called *affections*, or *paſſions of the minde*, are common to all living creatures: But according to more and leſſe, for Sanguine creatures are merry; Melancholy, ſad; Flegmatick, faint; Cholerick, furious, *&c.*

LVI. *The ſaid animall ſpirit moves the members, but with the uſe of inſtruments; Tendons and Muſcles, and the joynts of the bones.*

The puppets wherewith Juglers (a pleaſant ſight to children) ſhew playes, that

they may turne themselves about, as though they were alive, must of necessity have: 1 *Joynts* of the members, that they may bow. 2 *Nerves* or strings with which drawne to and fro they are bowed. 3 Some living strength which may draw the nerves forward and backward; which the *neuro-spasta* that is hid under the covering supplies. Just so to the motion of a living creature, there are requisite: 1 Joynts or knuckles of bones. For bones were given to a living creature, that he might stand upright: But that he might bend also, his bones were not given him continued, but divided with joynts of limbs.

2. Certain ligaments fastned about the bones, wherewith attraction and relaxation might be made; therefore certaine *tendons* were given them as it were cords, being of a nervy and half gristly substance, which growing out of the head of one bone, and running along the side of another bone, grow to the lower head thereof; and when the tendon is drawne, the following bone is drawne, so as to bend it self. Now it is to be noted, that these tendons about the joynts of the bones are bare on both sides; but about the middle of them they

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are extended into a kinde of a membranceous purſe ſtuffed up with fleſh: Which fleſh or fleſhy purſe they call a muſcle, of which every member hath many: not only leaſt that the tendons when they are drawne ſhould depart out of their place; or the bones or tendons be hurt with oft rubbing againſt one another; or for the ſhape of a living creature only (for what a body would that be which conſiſted of meer bones, veins, nerves, and tendons? a *Sceleton*) but becauſe there can be no motion at all without muſcles: as it ſhall forthwith appear.

3. The *neuroſpaſta* or inviſible mover, is the animal ſpirit; which as it can at the pleaſure of the phantaſie, convey it ſelf into the belly of this or that muſcle, ſo it ſtretches or dilates it as it were a paire of bellowes, and drawes in that which is oppoſite, from whence nothing can follow but the bending of that member.

Thence it appears: 1. *That the animall ſpirit can move nothing without an Organ*: For why doth no man bend his knees before? becauſe there wants a knuckle above. Why doth no man move his ear? becauſe that member wants muſcles, *&c.*

2. It appeares alſo, *That by how many*

the more muſcles are given to any member, by ſo much the nimbler it is unto motion: by how much the bigger, ſo much the ſtronger; For example, in the hands and feet, that they might be ſufficiently able to undergo the variety of labours and going. It appeares alſo why they that are muſculy or brawnie, are ſtrong, but thoſe that are thin, are weak?

3. It appeares alſo that the animal ſpirit is moſt buſie in motion, running to and fro at the command of the phantaſie, moſt ſpeedily through the nerves and arteries.

4. That the motion of a living creature is compounded of an agitative, expanſive and contractive, impulſive and continuative motion. For the animal ſpirit conveys it ſelf at the pleaſure of the phantaſie, into this or that muſcle: and the muſcle giving place to the ſpirit flowing in, ſtretcheth forth it ſelf: then when the muſcle is ſtretched forth in breadth, the length of it muſt be contracted of neceſſity: and the tendon followes the muſcle contracting it ſelf, and drawes with it the head of the next bone by the motion of continuity; all with inexplicable quickneſſe.

5. It appears alſo that this local motion (either of the whole living creature, or of ſome

ſome member) is made about ſomething immoveable with various enforcings.

6. And becauſe it is with enforcing, it cannot be without wearineſſe.

7. And becauſe it is vvith vvearineſſe, there is ſometimes needs of reſt; vvhich is given in three kinds. 1 *Standing*. 2 *Sitting*. 3 *Lying*. *Standing* is a reſting of the feet, but with an inclination of the body to motion: therefore it is done by libration. *Sitting* is reſt in the middeſt of the body: whereby the other parts are the more eaſily preſerved in *Æquilibrio*. *Lying* is a total reſt. That is, a proſtrating of the body all along: But as too much motion brings wearineſſe, ſo too much reſt cauſeth tediouſneſſe: becauſe the ſpirit loves to ſtir it ſelf. And the ſame poſition of the members a long while together by reſt, is alike troubleſome: both for that the lower members are preſſed with the vveight of the upper, and alſo for that the ſpirit deſires to move it ſelf any way. Hence it is in that vve turne us oft in our ſleep.

Of the enuntiative faculty.

That a living creature might give know-

ledge of it self by a voice, the animal spirit doth that, at the direction of the phantasie: but it hath these Organs, the Lungs, the rough Arterie, and the Mouth.

LVII. *To every living creature (fishes excepted) there was given lungs, to coole the heart, with a gristly pipe called the* rough arteterie. *Which notwithstanding serves withall to send forth a voice: because that in the upper part of it, it hath the forme of a pipe, wherewith the aire being stricken may be divided and sent sounding forth.*

LVIII. *And that the voice might be both raised, and let fall, that pipe is composed of gristly rings; the lowest of which, if it oppose it self to the aire as it passeth by, there is a deep repercussion, that is a grave voice; but if the highest, there is an high repercussion, that is a shrill voice, every one may make triall of that in himself.*

LIX. *And that the sound may be articulate,* (as in speech and the singing of some birds) *that the tongue, beating the sound too and fro, also the lips, the teeth and nostrils, and the throat performe.*

Of the defensive faculty.

LX. *The animall spirit if it perceive any hostile thing approach unto it, hath presently recourse to its weapons, whereby either to defend it self* (setting up its haires, bristles, scales, prickles) *or to offend and hurt its enemies* (using its hornes, nailes, wings, beak, hands, &c.)

Which by vertue of what strength it is done, may already be known out of what hath been said before.

Of the generative faculty.

Seeing that living creatures as well as plants, are mortal entities: they must of necessitie be multiplied, for the conservation of their species; touching which marke the Axiomes following.

LXI. *Because that the generation of living creatnres, by reason of the multitude and tenderresse of their members, could not commodiously be performed in the bowels of the earth: they had a different sex given them. And it was ordained that the new living creature should be formed in the very body of the living creature it self.*

As the ſun by its heat doth beget plants in the wombe of the earth, ſo it may alſo thoſe living things, whoſe formation is finiſhed with in ſome few dayes, as wormes, mice, and diverſe inſects, (which is done either by the ſeed of the ſame living creatures falling into an apt matter ſcattered, or by the ſpirit of the univerſe, falling into an apt matter. But more perfect living creatures, which conſiſt of many and ſolide members, and want much time for their formation (as a man, an horſe, an elephant) it cannot beget. For being that the Sun cannot ſtay ſo long in the ſame coaſt of heaven, the young one would be ſpoiled before it could come to perfection. Therefore the moſt wiſe Creatour of things, appointed the place of formation to be, not in the earth, but in the living creature it ſelf; having formed two ſexes, that one might do the part of the plant bearing the ſeed, the other of the earth, cheriſhing, and as it were hatching the ſeed. This alone and none other is the end of different ſexes in all living creatures. Wo be to the raſhneſſe and madneſs of men, which abuſe them! as no beaſt doth. The members, whereby the ſexes differ, are the ſame in number, ſite and form, and differ in nothing

almoſt

almoſt unleſs it be in regard of *exterius* and *interius*: to wit the greater force of heat in the male thruſting the genitals outward, but in the female by reaſon of the weaker heat the ſaid members conteining themſelves within: which Anatomiſts know.

LXII *The ſpirit is the directour of all generation, like as in plants; which being heated in the ſeed, firſt formes it ſelfe a place of abode, that is the brains and head: and thence making excurſions, formes the reſt of the members by little and little, and gently: and again retiring to its ſeat, reſts and operates by turns: whence the original of waking and ſleeping.*

Therefore the formation of a living creature doth not begin from the heart, as *Ariſtotle* thought, but from the head, for the head is as it were the whole living creature; the reſt of the body is nothing but a ſtructure of organs for divers operations. And that appears plain, for ſome living creatures (as fiſhes) have no heart, but none are without a head and brains.

Of the kinds of living creatures.

Thus much of a living creature in generall; the kinds follow.

LXIII *A living creature according to the difference of its motion is* 1 *Reptile.* 2 *Greſſile.* 3 *Natatile.* 4 *Volatile.* LXIV *Rep-*

LXIV *Reptile, or a creeping thing is a living creature with a long body, wanting feet, yet compounded of joynts (or gristly rings) by the contraction and extension of which it windes up and reacheth out it selfe:* as are wormes and serpents.

LXV *Gressile is, that which hath feet (two or more) and goeth*; as a lizard, a mouse, a dog, &c.

LXVI *Natatile is, that which passeth through the water by the help of finns: it is called a fish: amongst which crabs also, and divers sea-monsters are reckoned.*

LXVII *Volatile is, that which moves it selfe through the air, by the shaking of its wings*; *and is called a bird.*

The lightnesse of birds to flie, is from their plumosity. For every plume or feather, not only in the stalk, but through all its parts, and particles of its parts, is hollow and full of spirit and vapour. And for this cause no birds pisse: because all their moisture perpetually evaporates into feathers. It is impossible therefore for a man to flie, though he fit himselfe with wings, because he wants feathers to raise him: and those which he takes to him, are dead, and void of heat and spirit.

LXVIII

LXVIII *Small living things are by a ſpeciall name called inſects*; as flies, wormes, &c.

They are called inſects, from the inciſions whereby their bodies are cut off round as it were. Theſe may be divided after the ſame manner. For wormes are *Reptile*, Lice, Fleas, Punies, Spiders, &c. *Greſſile*, the water-ſpider, and the horſe-leech, &c. *Natatile*, Flies and Gnats, &c. *Volatile*, and all thoſe with infinite differences, ſo that here alſo there is not wanting a moſt clear glaſſe of the admirable wiſdome of the Creatour; and a ſchoole to man, to learn virtues, and forget vices (of both which there are an expreſſe image in living creatures, which the Scripture oft inculcates.)

An Apendix.

Of the tenacious inherencie of the animall ſpirits in its matter.

WE ſhewed toward the end of the ninth Chap, how faſt the *naturall and vitall ſpirit* inhereth in its matter: we are now to give notice of the like in the *animall ſpirit*, how firmly it alſo abideth in its matter, that is the bloud, the underſtanding of which thing, will alſo adde much light to

thoſe places of Scripture, where it is ſaid *that the ſoule of every living creature is in the bloud thereof*; yea, *that the bloud of all fleſh, is the life thereof*, as *Gen.9. v.4. Levit.* 17. *v.* 11. and 14. *Deut.*12. *v.*23.) And to certain ſecrets of nature, which they are aſtoniſhed at, who are ignorant of the manner and reaſon of them.

I Firſt, then it is certain that the animall, as well as the vitall ſpirit, may be bound into its ſeed with the cold, ſo as that for a time it cannot exerciſe its operation. For as grains of corn kept all winter (either in a garner, or in the earth) do bud nevertheleſſe: ſo the eggs of fiſhes, frogs, piſmires, beetles, ſcattered either upon the earth or waters, do bring forth young the year following.

II In bodies already formed the ſame ſpirit, compelled ſometimes by ſome force, forſakes the members, and ceaſeth from all operation: yet conglobates it ſelfe to the center of the body, and coucheth ſo cloſe, that for many dayes, moneths, years, it lies as it were aſleep, yet at length it awakens again, and diffuſeth it ſelf through the members, and proceeds to execute vitall operations as it did before. We find it ſo to

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be in Flies, Spiders, Frogs, Swallowes, &c. which in winter lie as though they were dead in the chinks of wals, or chaps of the earth, or under the water, yet when the Spring comes in, they are alive again So flies choaked in water, come to life again in warm cinders: like as it is certain, that men ſtrangled have been brought to life again after ſome hours, And beſides there is an example commonly known of a boy killed with cold, and found four dayes after, and raiſed again with foments. Trances continued for ſome dayes are ordinarily known hence: ſome ready to be buried, as though they had been dead indeed, yea, and buried too, yet have lived again Some Geographers have written, how that in the fartheſt parts of *Moſcovia*, men are frozen every year with extream cold, and yet live again like ſwallows: which notwithſtanding as a thing uncertain, we leave to its place.

111 The third and the moſt ſtrange is this, that the ſpirit flowes out with the blood that is ſhed, and yet gives not over to maintain its conſent with the ſpirit remaining within the body: (whither the greater part thereof remain or only the relicks:)

licks:) which is moſt evidently gathered from divers ſympathies and antipathies, I will illuſtrate it with five examples.

1 *Whence is it*; *I pray you that an oxe quakes, and is madded, and runs away at the preſence of the butcher?* is it not becauſe he ſmels the garments, the hand, the very breath of the butcher ſtained with the bloud and ſpirit of cattle of his own kind? which is alſo moſt clear from the irreconcilable antipathy, which is found to be betwixt dogs, and dog-killers.

2 *Whence is it that the body of a ſlain man bleeds at the preſence of the murderer, and that after ſome dayes, or months, yea, and years?* (For it is manifeſt by a thouſand trialls that it is ſo: and at *Itzenhow* in *Denmark*, *Simeon Gulartius* relates that the hand of a dead man cut off, and hung up, and dried in priſon, diſcovered the murderer full ten years after by bleeding, as a thing confirmed by great witneſſes, and thoſe of the Kings Counſell) and certainly we are not to flie to miracles where nature it ſelfe by conſtant obſervation ſhewes her lawes. It is very likely that the ſpirit of the man ready to be ſlain, provoked with the injury when it is ſhed forth with the bloud, pouring out it ſelfe

ſelfe as it were in revenge, leaps upon the murderer: and that after the ſame ſort as we ſee a dog, a wild beaſt, or oxe, when he is killed, run furiouſly upon him that ſtriketh him. For if the ſpirit do ſo yet abiding in the body, why not parted from it? Therefore it is to be ſuppoſed that it leaps upon the murderer, and ſeiſes on him. Whence it comes to paſſe, that when he comes near the body (eſpecially if he be commanded to touch it, or look upon it) look how much ſpirit is left in the body, it haſteth to meet with its ſpirit, with its chariot the bloud, namely by ſympathie. Hence that Antipathie which more ſubtle natures find in themſelves againſt murderers though unknown. For they tremble at the very preſence of murderers, and nauſeat if they do but eat or drink with them, &c.

2. The cunning of a moſt excellent Chirurgeon in *Italy* is [well] known, who helpt one that had loſt his noſe, carving him another out of his arme, cut and bound to his face for the ſpace of a moneth: and the ridiculous chance [that happened thereupon] a little after is alſo known. A certain Noble man having alſo had his noſe cut off in a duell, deſired his help; but being deli-

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cate and not willing to have his arme cut, hired a poor countrey fellow, who ſuffered himſelfe to be bound to him, and his arme to be made uſe of to repair his noſe. The cure ſucceeded: but when as about ſome ſix years after, (or thereabouts) the country man died, the Noble mans noſe rotted too, and fell off. What could be the cauſe of it, I pray you, but that the ſpirit, and that locally ſeparated, doth maintain its ſpirituall unity? Therefore when the ſpirit went out of the countrey mans carcaſſe, as it rotted, part of it alſo went out that the Noble mans noſe, and his noſe (by reaſon of the Noble mans ſpirit, ſucceeded not [into the place of it] as being into the lump of anothers [fleſh]) rotted alſo, and fell off.

4 It is accounted amongſt the ſecrets of nature, that if friends about to part, drink part one of anothers bloud, (and ſo addes a part of his ſpirit to his own) it will come to paſſe, that when one is ſick, or ill at eaſe, though very far aſunder, the other alſo will find himſelfe ſad: which if it be true, (as it is moſt likely) the reaſon is eaſie to be known.

5 The Magneticall Medicine is very famous amongſt Authours: with which they do

do not cure the wound it ſelfe, but the inſtrument wherewith the wound was given, or the garment, wood, or earth beſprinkled with the bloud of the wound, is onely anointed: and the wound cloſes and heals kindly. Some deny that this is done naturally, who do not ſufficiently conſider the ſecret ſtrength of nature. Yet examples ſhew that this kind of cure, with an ointment made with moſt naturall things, (yea with nothing but the greaſe of the axel-tree, ſcraped off from a cart) hath certain ſucceſſe, without uſing any ſuperſtition. Wherefore it is credible, that the ſpirit poured out of the body with the bloud that is ſhed, adheres partly in the bloud, partly to the inſtrument it ſelf: (for it cannot abide without matter) & being forced thence with the fat that is applied returnes to its whole, and ſupplies that, and hereto perhaps that obſervation appertains concerning the venom of a ſnake, viper, or ſcorpion conveyed into a man with a bite. For if the ſame beaſt, or but the bloud or fat thereof, be forthwith applied to the wound, it ſucks out the venom again, becauſe it returns to its own connaturall. More of this kind might be obſerved by approved experiments.

6 Last of all, it is not unworthy of our observation, that the animall spirit doth form living creatures of another kind, rather then quite forsake the putrifying matter: namely, wormes, and such like. Now it is certain by experience, that of living creatures that are dead, and putrified those living creatures are especially bred on which they were wont to feed when they were alive. For example, of the flesh of storks, serpents are bred, of hens spiders, of ducks frogs, &c. which that it will to come to passe, if they be buried in dung, *John Poppus* a distiller of *Coburg*, hath taught after others. It appears then that the animall spirit is every where, and that very diligently busied, about the animating or bodies.

CHAP. XI.

Of Man.

I *Man is a living creature, endued with an immortall soule.*

For the Creatour inspired a soul into him, out of himselfe, *Gen.* 2. *v* 7. which soul is called also *the mind and reason*, in vvhich the image of God shineth.

II *There-*

II *Therefore he is compounded of three things, a body, a ſpirit, and a ſoule.*

So the Apoſtle teſtifies. 1 Theſ. 5. 13. *Let your whole ſpirit, and ſoul, and body be kept blameleſſe.* And ſo 1 Cor: 14. verſ. 14. *He diſtinguiſheth betwixt the ſpirit and the minde.* And indeed ſo it is: vve have a body compounded of the Elements as vvell as bruits; vve have a ſpirit from the ſpirit of the world, as vvell as they: but the ſoule or minde is from God. The firſt vve bear about immortall: the ſecond diſſipable: but the laſt enduring ever without the body; as we are aſſured by faith. Therefore when thou ſeeſt a man, think that thou ſeeſt a King, royally cloathed, and ſitting in his royall throne. For the *minde* is a King, his robe is the *ſpirit*, his throne the *body*.

III *The body is the Organ and habitation of the ſpirit: but the ſpirit is the habitation and manſion of the ſoul.*

For as the ſpirit dwels in the body, and guides it, as the Pilot doth the ſhip; ſo the ſoul dwels in the ſpirit, and rules it. And as a body without a ſpirit, neither moves it ſelf, nor hath any ſenſe of any thing (as it is to be ſeen in a dead carcaſſe:) ſo the ſpirit vvithout the minde, hath no reaſon, nor

understands any thing; as we see in bruit beasts Therefore the soul useth the spirit for its chariot and instrument; the spirit, the body; and the body, the foresaid instruments.

IV *As the spirit is affected by the body; so is the minde by the spirit.*

For as when the body is diseased, the spirit is presently sad, or hindred from its action: so when the spirit is ill disposed, the minde cannot performe its functions dextrously: as we may see in drunken, melancholie, mad-men, *&c.* Hence it is, that the gifts of the minde follow the temperature of the body; that one is more ingenious, courteous, chast, courageous, *&c*, then another Hence that fight within us, which the Scripture so oft mentions, and we our selves feel. For *the body and the soul*, being that they are extreams (the one earthly, the other heavenly; the one bruit, the other rational; the one mortall, the other immortall; are alway contrary to one another in their inclinations. Now *the spirit* which is placed betwixt them, ought indeed to obey the superiour part, and keep the lower part in order as its beck. Yet nevertheless it comes oft so to passe, that it is carried away of the flesh, and becomes brutish.

V *Such*

V. *Such a body was given to man as might fitly ſerve all the uſes of his reaſonable ſoule, And therefore:* 1 *Furniſhed with many Organs.* 2 *Erect.* 3 *Naked and unarmed, that it might be free of it ſelf, and yet might be cloathed and armed any way as occaſion required.*

For *the hand*, the inſtrument of inſtruments, the moſt painful doer of all works, was given to man only. He only hath obteined an erect ſtature, leaſt he ſhould live unmindful of his countrey, Heaven. Again, he only was made naked and unarmed; but both by the ſingular favours of God. For living creatures whileſt they always bear about them their garment, (haires, feathers, ſhels) and their armes (ſharp prickles, horns) what do they bear about them but burdens, and hindrances of divers actions? The liberty granted to man, and induſtry in providing, fitting and laying up all things for his uſe and pleaſure, is ſomething more divine.

VI. *A more copious and pure ſpirit was given to man, and therefore his inward operations are more excellent, namely a quicker attention, a ſtronger imagination, a ſurer memory, more vehement affections.*

The first appears from the braine, which is given in greater plenty to man then to any living creature, (considering the proportion of every ones body.) For all that round head, and of so great capacity, is filled up vvith brain; to what end? but that the spirit might have a more spacious vvorkhouse and palace. The rest are known by experience as followeth.

VII *Attention is a considerate receiving of the objects, brought into the sensorie instruments.*

We said in the former Chapter, that it is commonly called *the common sense.* This vvas given to man so much the quicker, as it is destinated to more objects, and more distinctly to be perceived.

VIII *Imagination, is the moving of things perceived by the sense within, and an efformation of the like.*

For the image of the thing seen, heard, or touched with attention; presently gets into the brain, which the spirit by contemplation judges of, what it is, and how it differs from this or that thing? therefore it may well be called (in this sense) the judgment. This imagination is stronger in a man, then in any living creature: so that it

it feignes new formes of things, namely by dividing or variously compounding things conceived. And this is done with such quicknesse, that upon every occasion we imagine any thing to our selves, as we find dreaming and waking: and by how much the purer spirit any one hath, he is so much the more prompt to think or imagine; but dulnesse proceeds from a grosse spirit.

Observe this also: That the animal spirit when it speculates forward, and drawes new images of things from the senses, is said *to learne*, when backward, resuming images from the memory, it is said *to remember*: When it is moved too and fro within it self it is said to feigne somewhat. *Note also*, that from the evidence of sensation growes the degree of knowledge, for if the sense perceive any thing a farre off, or weakly and obscurely, it is *a generall conception*: If nearer, distinctly, and perspicuously, it is *a particular conception*: for example, when I see something move a great way off, I gather it to be a living creature: when I come near, I know it to be a man, and at length this or that man, *&c.*

IX. *Memory (remembrance) is the imagination of a thing past, arising from the sense*

of a thing present, by reason of some likeneſſe.

For vve do not remember any thing otherwiſe, then by a like object: For example, if I ſee a man, that reſembles my father in his face, preſently the memory of my father comes into my minde. So by occaſion of divers accidents, as place, time, figure, colour, ſound, *&c.* divers things may come to minde, where the like vvas ſeen, heard, *&c.* vvhich occaſion ſometimes is ſo ſlight and ſuddain, that it can ſcarce be marked, for what is quicker then the ſpirit?

N. Now it may be demanded: ſeeing that the animal ſpirit moveth it ſelf ſo variouſly in the brain, yea, and other nevv ſpirit alwayes ſucceeding by nutrition; how is it that the images of things do not periſh, but readily offer themſelves to our remembrance? *Anſw:* Look down from a bridge into the vvater gently gliding, you ſhall ſee your face unvaried though the vvater paſſe away. And vvhen you ſee any thing toſſed vvith the vvind in a free aire, the winde doth not carry away the image of the thing from thine eye: What is the cauſe? But that the impreſſion of the image is not in the water,

water, nor in the aire: but in the eye, from the light reflected indeed from the water and penetrating the aire. So then in like manner, an inward impression is not really made in the brain, but by a certaine resplendency in the spirit: Which resplendency may be kindled again by any like object. Otherwise if images were really imprinted in the brain, we could not see any thing otherwise in our sleep, then it had once imprinted it self in the brain being seen. But being that they are variously changed, it appears that notions are made not by reall impressions, but by the bare motion of the spirit, and the imagination of like by like.

X *An affection is a motion of the minde, coming from imaginations desiring good, and shunning evill.*

There are more affections and more vehement in a man. For bruits scarce know shame, envy and jealousie, and are not so violently hurried into fury and despaire, or again into excessive joyfulnesse; thence laughter and weeping still belong to man only.

XI *The minde of man is immediately from God.*

For

For the Scripture saith, *That it was inspired by God*, Gen. 2. v. 7. *and that after the death of the body it returnes to God, that gave it*, Eccles. 2. v. 7. For it returnes to be judged for those things which it did in the body, whether good or evill: 2 *Cor.* 5. *v.* 10. But we are not to thinke that the soul is inspired out of the effence of God, as though it were any part of the deity: (For God is not divisible into parts, neither can he enter into one effence with the creature.) And *Moses* words found thus: *And God breathed into the face of* Adam *the breath of life, and man became a living soule.* See he doth not say that that breath (or inspiration) became a living soule, but man became a living soul) *Nor yet are we to think, that the soul was created out of nothing, as though it were a new entitie; but only that a new perfection is put into the animall spirit in a man: so that it becomes one degree superiour, to the soul of a beast*, that appears out of *Zach.* 12. *v.* 1. *Where God testifies that he formes the spirit of man in the midst of him.* Behold, he forms, and not creates it! It is the same word (יצר *Jatzar*) which is used of the body also; *Gen.* 2. *v.* 7. As therefore the body is formed of the præ-existent matter, so is the soul

of

of the præ-existent spirit of the vvorld. Aud by consequent even as the earth, vvater, air, and skie are all one matter of the world, differing only in the degree of their density: so the *naturall*, *vitall*, *animall*, and this *mentall spirit*, *are all one spirit of the world*, differing only in the degree of their purity and perfection. Therefore it is credible, that the divine inspiration conferred no more upon man, but this, that he 1 refined the inmost part of his spirit, that in subtility of actions he might come neareſt to God of all visible creatures. 2 Fixed it, that it might subsist both in the body and out of the body. Therefore the Scripture makes no other difference betwixt the spirit of a man and of a beast, then *that the one ascends upwards*, *the other goes downwards*, (that is the one flees out of the matter, the other slides back into the matter) *Eccles. 3. v. 21.* Hence also that question, *Whether the soul be propagated by generation?* may be determined. The root of the soul which is the vitall and animall spirit, is certainly by generation: but the formation thereof (that the inmost parts thereof should become the mentall spirit, or the minde) God attributes to himself, *Zach. 12. 1.* Yet not con-

concurring extraordinarily, or miraculouſly, but becauſe he hath ordained that it ſhall be ſo in the nature of man. It appears alſo, *why man is commonly ſaid to conſiſt of a body and a ſoule only?* namely, becauſe, *the rationall ſoule is of the ſpirit, and in the ſpirit.* For as our body is made of a four-fold matter, that is, of the four Elements: ſo our ſoule (to ſpeak generally, and contradiſtinguiſh it from the body) conſiſts of a four-fold ſpirit, Naturall, Vitall, Animall, and Mentall.

XII There are three faculties of the mind of man, the Underſtanding, the Will, and the Conſcience.

Theſe anſwer to the three functions of the animall ſpirit, or to the *inward ſenſes*; out of which alſo they reſult. For we have ſaid, that as the ſpirit uſeth the body for its Organ, ſo the ſoule uſeth the ſpirit. Therefore the three inward Senſes, *Attention, Judgement, and Memory*, are inſtruments by which the ſoule uſeth the Underſtanding, Will, and Conſcience. For by diligent attention it begets underſtanding of things: by imagination or judging, choiſe, that is, to will or nill: by remembrance, conſcience.

XIII The

XIII The understanding is a faculty of the reasonable soule, gathering things unknown out of things known, and out of things uncertain compared together, drawing things certain, by reasoning.

XIV To reason is to enquire the reasons and causes why any thing is, or is not, by thinking thereon.

For the mind or reason doth from the experiments of the senses gathered together, first form to it selfe certain generall notions: as, when it seeth that the fire scorcheth all things, it formes to it selfe this rule as it were: *All fire burneth*, &c. Such kind of experimentall notions they call principles, from which the understanding, as occasion is offered, frames discourse. For example, if gold melt with fire, then it is hot also, and burns when it is melted. Whence follows this conclusion: therefore if the Workman pour gold into his hand he is burnt therewith. See here is understanding, and that of a thing never seen! to which a bruite cannot attain For they do not reason but stay simply upon experiments. As if a dog be beaten with a staffe, he runs away afterward at the sight of a staffe, because his late suffering comes into his memory:

mory: but that he ſhould reaſon, (for example, a ſtaffe is hard; and pain was cauſed me with a ſtaffe: therefore every hard thing ſtruck againſt the body cauſeth pain:) this he cannot do, therefore *intelligere*, to underſtand, is *inter legere*, that is, amongſt many things to chuſe and determine what is truly, and what is not.

XV When ratiocination doth cohere with it ſelfe every way, it begets verity: if it gape any where, errour.

XVI Promptneſſe of reaſoning is called Ingenuity; *ſolidity*, Judgement; *defect*, Dulneſſe

For he is *Ingenious*, who perceives and diſcourſeth readily: he *Judicious* that with a certain naturall celerity giveth heed whether the reaſoning cohere ſufficiently every way. He is dull that hath neither of them. The two firſt are from *the temperature of bloud and melancholy*; the laſt comes from abundance of flegme. For melancholy (underſtand not groſſe and full of dregs, but pure) tempered with much bloud, giveth a nimble wit; but moiſtned with leſſe, a piercing and conſtant judgement: which is made plaine by this ſimilitude. A glaſſe receiving and rendring ſhapes excellently

lently, is compounded of three exceedings: exceeding hardneſſe, exceeding ſmoothneſſe, exceeding blackneſſe: for the ſmoothneſſe receives ſhapes: hardneſſe retems them: the blackneſſe underneath clears them. (Hence the beſt ſort of glaſſes are of ſteel, thoſe of ſilver worſe, and of glaſſe better: by reaſon of their greater ſmoothneſſe and hardneſſe under which ſome black thing is put, or caſt, that it may adhere immediately: For inſtance, lead. If it could be iron or ſteel, it is certain, that the images would be the brighter for blackneſs.) So the animall ſpirits, receiving agility from pure *bloud*, ſtrength and conſtancy from *Melancholy*, make men *ingenious*: and when the prevailing melancholy clarifies the imagination; *Judicious*, too much *flegme* overflowing both, makes men *ſtupid*. *Yellow choler* conferreth nothing but mobility to the affections: whence it is not without cauſe, called the whetſtone of wits.

XVII The underſtanding begins with univerſals, but ends in ſingulars.

We have obſerved the ſame touching the ſenſes, upon the eighth Aphoriſme. For there is a like reaſon for both, in as much as the intellect conſidering any object, firſt knows

knows that it is ſomething; and afterwards enquires by diſcourſing what it is, and how it differs from other things, and that alwayes more and more ſubtilely. For univerſals are confuſed, ſingulars diſtinct. Therefore the underſtanding of God is moſt perfect, becauſe he knowes all ſingularities, by moſt ſpeciall differences: Therefore he alone truly knoweth all things. But a man by how many the more particulars he knows, and ſees how they depend upon their generals, by ſo much the wiſer he is. Therefore *Ariſtotle* ſaid not rightly, *That ſenſe is of ſingulars, but underſtanding of univerſals.*

XVIII The will is a faculty of the reaſonable ſoul, inclining it to good fore-known, and turning it away from evill fore-ſeen.

For the ſoule works, that whereunto the will enclines; and the will enclines, whither the underſtanding leads it. It follows this for its guides every where: and erres not unleſſe it erre. As, when a Chriſtian chuſeth drunkenneſſe rather then ſobriety, (though he be taught otherwiſe) he doth it, becauſe the intellect deceived by the ſenſe, judgeth it better to pleaſe the palate, then to be tormented with thirſt,

thirſt, (though perverſe.) Therefore we muſt have a ſpeciall care, leaſt the intellect ſhould erre, or be carried away with the inferiour appetite. It appears alſo from thence, that if all men underſtood alike, they would alſo will and nill alike: but the diverſity of wils, argues a diverſity of underſtanding.

XIX If the will prudently follow things that are truly good, and prudently avoid things that are truly bad, it begets virtue; if it do the contrary, vice.

For virtue is nothing elſe, but a prudent, and conſtant, and ardent ſhunning of evill, and embracing of good: vice, on the contrary, is nothing but a neglecting of good, and embracing of evill.

XX The conſcience of man, is an intellectuall memory of thoſe things which reaſon dictates either to be done, or avoided; and what the will hath done or not done according to this rule; and what God hath denounced to thoſe that doe them, or doe them not.

Therefore the function of it in the ſoule is three-fold: to *warn*, *teſtifie*, and *judge* of all things that are done, or to be done See by the Wiſdome of God an inward-

Monitor, Witneſſe, and Judge, and always ſtanding by, given to man! woe be to him that neglects this Monitor, contemnes this Witneſſe, throwes off the reverence of this Judge!

XXI It appears out of that which hath been ſaid, that MAN *is well termed μικρόκοσμος, a little world.* Becauſe

1 *He is compounded of the ſame that μακρόκοσμος*, or *the great World is*: matter, ſpirit, light.

2 *He reſembles the univerſe in the ſite of his members*: for as that is divided into three parts, the Elementary, the Cœleſtiall, and the Supercœleſtiall: ſo a man hath three ventres or bellies; the loweſt which ſerves for nutrition: the middle-moſt (or the breaſt) wherein is the work-houſe of life, and the fountain of heat: the higheſt (or the head) in which the animall ſpirits, and in them reaſon, the image of God, inhabits.

3 *There is an analogy betwixt the parts of the world, and the parts of the body.* For example; Fleſh repreſents the Earth; Bones the Stones; Bloud and other humours, Waters; Vapours, of which the body is full, the air; the vitall ſpirit, the Heaven,

and

and Stars; the Haires, Plants; but the ſeven Planets are the ſeven vitall Members in our body: for the Heart is in the place of *the Sun*; the Brain, of *the Moon*; the Spleen, of *Saturn*; the Liver, of *Jupiter*; the Bag of Gall; *Mars*; the Reins; *Venus*; the Lungs, *Mercury*, &c. Laſtly, certain creatures ſhew forth their virtues in certaine parts of the body. For example, ſome herbs cure the Lungs, ſome the Liver, &c. which ſhews a certain analogy of the Microcoſme to the Macrocoſme, though not well known to us.

XXII *Alſo Man is not abſurdly called* πᾶν, *or the all*; *becauſe*;

1 *He hath his body from the Elements*; *his ſpirit from Heaven, his mind from God*: and ſo in himſelfe alone he repreſents the viſible and the inviſible world.

2 *Man is all*, *becauſe he is apt to be all*; that is, either moſt excellent, or very baſe. For if he give himſelfe to earthly things, he becomes brutiſh, and falls back again to nothing: if to heavenly things, he is in a manner deified, and gets above all creatures.

CHAP. XII.

Of Angels.

WE joyn the treatiſe concerning Angels with the Phyſicks; becauſe they alſo are a part of the created World, and in the ſcale of creatures next to man; by whoſe nature, the nature of *Angels* is the eaſier to be explained. Therefore we will conclude it in ſome few *Aphoriſmes*.

1 *There are Angels.*

Divine teſtimonies, and apparitions teſtifie that: and alſo a *three-fold reaſon*. 1 Vapours, concretes, plants, living creatures are mixt of water and ſpirit. Now there is matter without ſpirit (the pure Element;) therefore there is ſpirit alſo without matter. 2 *As* the matter of the world is divided into four kinds, (the four Elements) ſo we ſee already the ſpirit of the world to be diſtinguiſhed into the naturall, vitall, animall, and mentall ſpirit. Now the loweſt degree is to be found alone (as in concretes.) Therefore the higheſt may be found alone, to wit, in the *Angels*. 3 Every creature is com-

compounded of Entitie, and Nihility. (For they were nothing before the creation: but now they are ſomething; becauſe the Cretour hath beſtowed on them of his Entitie, more or leſſe by degrees. By how much the more entitie any thing hath, ſo much the further it is from nihility: and on the contrary.) Seeing then then that there is the firſt degree from nihility, (that is a *Chaos*, the rudiment of an Entitie:) without doubt there is the laſt alſo, which comes neareſt to a pure Entitie. But man is not ſuch: becauſe having matter admixt, he partakes much of nihility. Therefore of neceſſity there is a creature, with which, materiality being taken away, all other perfections remain. And that is an *Angell*.

II *An Angell is an incorporeall man.*

An Angell may be called a man, in the ſame ſenſe that man himſelfe is called an animall, and an animall, a plant; and a plant, a concrete, &c. (as we have ſet down in their definitions:) that is, by reaſon of the forme of the precedent included, with a new perfection only ſuper-added. For a man is a rationall creature made after the Image of God, immortall: ſo is an *Angel*, but for more perfections ſake free from a

body. *Therefore an Angel is nothing but a spirit without a body: A man is nothing but an Angel clothed with a body.*

But that Angels are incorporous, appears 1 Becauſe although they be preſent, they are not diſcerned neither by the ſight, or any other ſenſe. 2 Becauſe they aſſume to themſelves earthly, watery, aery, fiery, or mixt bodies, as need requires; and put them off again; which they could not do, if they had bodies of their own as we have. Yet ordinarily they appear in an humane forme, by reaſon of the likeneſſe of their natures, as we have ſaid.

III *Angels were created before all viſible things.*

That was ſhewed in the Apendix of the firſt Chapter: you may ſee it again, if need be. And *Moſes* words are clear: *In the beginning God created the heaven and the earth: and the earth was void.* See the earth was (in that firſt production) emptie and void! Therefore heaven was not void: then it was filled with its hoſt, the Angels.

IV *The Angels were created out of the Spirit of the world.*

As *Moſes* ſeems to comprehend the production of Angels under the name of *Heaven,*

ven, ſo alſo the univerſall Spirit. For he doth not ſay, that this was created with the earth: but he pronounceth abruptly after the creation of the earth, *that the Spirit of God moved it ſelfe upon the waters:* intimating thus much that it was in being before. We conclude, therefore that the Angels were formed out of that Spirit; ſo that part of that ſpirit was left in the inviſible heaven, and ſhaped into meer ſpirituall ſubſtances, [*Angels*;] and part ſent down into the materiall world below. After the ſame manner, as the fire was afterward partly left in the Skie, and faſhioned into ſhining Globes: and partly ſunk into the bowels of the earth, for the working of minerals, and other uſes. That which follows makes this opinion probable, (if not demonſtrable.)

1 Principles ſhould not be multiplied without cauſe. Seeing therefore that the Scripture doth not ſay, that they were created out of nothing, nor yet names any other principle, why ſhould we not be ſatisfied with thoſe principles that *Moſes* hath ſet down?

2 Angels govern the bodies which they aſſume, like as our ſpirit inhabiting the

matter doth: Therefore they are like to it.

3 There is in Angels a ſenſe of things, as well as in our ſpirits. (For they ſee, hear, touch, &c. though they themſelves be inviſible, and intangible. Alſo they have a ſenſe of pleaſure and griefe: for as much as joyes are ſaid to be prepared for the Angels, and fire for the divells, (into which wicked men are alſo to be caſt.) Although therefore they perceive without Organs, yet we muſt needs hold that they are not unlike to our ſpirit which perceiveth by organs.

V *The Angels were created perfect.*

That is finiſhed in the ſame moment, ſo that nothing is added to their eſſence by adventitious encreaſe. For being that they are immateriall, they are alſo free from the law of materiality: that is (when a thing tends to perfection) to be condenſed, fixed, to encreaſe, and ſo to be augmented, and become ſolid by certain acceſſions.

V I *Angels are not begotten.*

Men, Animals and Plants, are generated, becauſe the ſpirit included in the matter, diffuſeth it ſelfe with the matter, and eſſayes to make new Entities. But an Angel being

being that it is without matter, and its essence cannot be dissipated, hath not whether to transfuse it selfe. Hence Christ saith, that in Heaven we shall be as the Angels, without generation, or desire of generation, *Mat.* 22. 30.

VII *Angels die not.*

The spirit of Animals and of Plants perisheth, because when the matter (that is, its chariot) is dissipated, it also is dissipated. But an Angell having his essence compacted by it selfe, without matter, cannot be dissipated: and therefore endures.

VIII *The number of Angels is in a manner infinite.*

See *Job* 25. *v.* 2, 3. yet *Daniel* names *thousands of thousands, and myriads of myriads, Dan.* 7. 10. as also *John, Apoc.* 5. 11.

IX *The habitation of the Angels is the Heaven of Heavens, Mat.* 18. *v.* 10. and 6. *v.* 10. Therefore they are called the *A*ngels of Heaven, *(Gal* 1. *v.* 8.*)* and the Host of Heaven, *(*1 *King.* 22. *v.* 19.*)* for it was meet, that as the earth, sea, air, and skie, have their inhabitants, so also that the Heaven of Heavens should not be left empty. Yet they are sent forth from thence for these following Ministeries.

X *God*

X *God created the Angels, that they might be,*

1 *The delight of their Creatour.*

2 *The supream spectatours of his glory.*

3 *His assistent Ministers in governing the World.*

The Scripture teacheth this every where: but they also point at names given them. The first appellation of Angels is in *Gen.*3. *v.*24. *Cherubim*, that is, *Images:* wherein is intimated that they were made after the image of God, as well as men. *But note what it is to be made after the image of God.* The essentiall image of God, or the character of his substance, is the Son, his eternall Wisdome, *Heb.*1. *v.*3. after the likenesse of him therefore, men and Angels are said to be created: that is, made understanding creatures: in which respect also they are called *the Sons of God*, *Job.*1. *v.* 2. seeing then that an Image delights him, whose Image it is, it is intimated that God made the Angels primarily for himselfe, that he might have some, who being cohabitants with him, might behold his glorious Majesty face to face, and be partakers of eternall beatitude. Now the most common name of Angels in the Old Testament,

ment is מלאכים *Malachim* that is, *Embaſſadours*: in the New Teſtament ἄγγελοι, that is, *meſſengers*; becauſe God created theſe to be rulers and governours of the World. For whenſoever the courſe of nature is to be hindered, or any thing is to be wrought beyond the ordinary order of nature, God uſeth their aſſiſtence. For example, When the fire was to be cooled, that it ſhould not burn, (*Dan.* 3. *v.*25,28.)

Or the mouthes of lions to be ſtopped, that they ſhould not tear *Daniel*, (*Dan.*6.*v.*22.)

Or the enterpriſes of the wicked to be hindered, (*Numb.*22.*v.*22.)

Or any to be killed by a ſudden death, (*Exod.*12.*v.*23. and 1 *Chron.*22.*v.*15. and 2 *Chron.*32.*v.*21. and *Acts* 12.*v.*23.)

Or the godly to be delivered from danger, (*Gen.*19.*v.*1.)

Or travellers to be guided in their way, (*Pſal.*91.*v.*11.)

Or to be preſerved in any chance, leſt they ſhould be dangerouſly hurt, *Pſal.*91.12.

Or to be warned any thing in a dream, or otherwiſe, *Mat.*1.20. *&c.*

Hence they are thought alſo to be added to certain perſons peculiarly, (*Heb.* 1.14. *Mat.* 18.10. *Acts* 12.15.) that they may accom-

accompany them every where, (*Psal.* 91. 11.) and be witnesses of all our actions, (1 *Cor.* 11. 9. 1 *Tim.* 5. 21.) but especially that they are sent to defend Kings and Kingdoms, (*Dan.* 10. 12. *&c.*) Hence also they are called, watchers or keepers, (*Dan.* 4. 10. 20.)

XI *Angels can act upon bodies, but they cannot suffer from bodies.*

Both these appear by the effect. For Angels bear about, move and governe the bodies which they assume: but those that are separated, they overthrow, stay and move from place to place with externall violence, at their pleasure; yet they themselves in the mean time can be hindred or stayed by no body.

XII *The powerr of Angels exceeds the strength of any corporall creature.*

For it operates 1 without resistance of the objects by penetrating. 2 without endeavour or enforcing, being that they are not deteined or hindred by their own body, as our spirit is: which being tied to the body, must of necessity draw it along with it laboriously, as the snail doth her shell. Hence the Angels are called *Mighty in power*, (*Psal.* 103. 20.) and *Powers, Principalities, Dominions*, (*Col.* 1. 16.)

XIII *The*

XIII *The agility of the Angels is greater then of any corporeall ſubſtance.*

Hence they are compared to Wind and to Fire, and to Lightning, *Pſal.* 104. 4. *Ezech.* 1. 13. *Luke* 10. 18. and they are called *Seraphim*, that is, *flamy*, *Iſai.* 6. 2. yet it is certain that they move ſwifter then wind or lightning, when they paſſe any whither. For the wind and lightning penetrate the air, not without reſiſtance, but an Angell, being a meer ſpirit, doth it without any reſiſtance. It appears then, that though an Angell be not in many places at once, (*Dan.* 10. 13. 20.) yet they can in a moment paſſe themſelves whither they will. Hence it is that one Angell was able to ſlay a whole army in a night; and alſo to ſmite the firſt born of the *Ægyptians*, throughout all the Kingdom, *Iſai.* 37. 36. *Exod.* 12. 23. and 2 *Sam.* 24. 6.

XIV *The knowledge of Angels is far more ſublime then mans.*

And that 1 becauſe of the clearneſſe of their underſtanding, which nothing obumbrates. 2 by reaſon of their power to penetrate any whither, and ſee things plainly. 3 becauſe of their long experience for ſo many ages. (Whereas we are but of yeſterday

yesterday, *Job* 8. 9.) and yet they are not omniscious. For they know not the decrees of God, before they be revealed. 2 future contingents. 3 the thoughts of mans heart. (*Jer.* 17. 9. 10.) that is, so long as they are concealed in the heart. For when they are discovered by gestures & effects, they discern them. For if we by the effects, are not altogether ignorant of their thoughts (2 *Cor.* 2. 11.) wherefore should not they be a thousand times more quick sighted upon us.

N. W. How that part of the Angels falling into evill, exercise perpetuall hostility with mankind: and God makes use of them to be as it were executioners to wicked men: but hereafter he will condemne them both; in like manner, as good men are to enjoy the association of good Angels: and lastly, how the frauds of those are to be avoided, but the presence of these to be procured, to teaach that belongs to sacred *Divinity*.

THE EPILOUGE.

THus we have seen that the created World is a meer harmony. All things by

by one, all things to one; the higheſt and the loweſt, the firſt and the laſt, moſt ſtraightly cleaving together, being concatenated by the intermediate things, and perpetuall ties, and mutuall actions and paſſions inevitable, ſo that the world being made up of a thouſand thouſand parts, and particles of parts, is nevertheleſſe one, and undivided in it ſelfe; even as *God* the Creatour thereof, *is one from eternity to eternity, nor ever was there, is there, or ſhall there be any other God, (Iſai. 43. 10. &c.)*

And we have ſeen that all theſe viſible things are made out of three principles, Matter, Spirit, and Light: becauſe he who is the beginning and the end of all things, α and ω, that thrice bleſſed and omnipotent God three in one, is he *of whom, and through whom, and in whom are all things, Rom. 11. 36.*

We have ſeen alſo that admirable ſcale of creatures, ariſing out of the principles, and aſcending by a ſeptenary gradation. For we have underſtood, that whatſoever there is beſides God, it is either an Element, or a Vapour, or a Concrete, or a Plant, or an Animall, or a Man, or an Angell; and that the whole multitude

tude of creatures, is ranked into these seven Classes, or great Tribes. In every of which there is some eminent virtue flowing from the essence of the Creatour (yet every latter including the former.) For

In { Elements, Being / Vapours, Motion / Concretes, Figure, or / Plants, Life. (Quality / Living creatures, Sense. / Men, Reason. / Angels, Understanding. } is eminent.

See *the house which Wisdome hath built her, having hewn out her seven pillars!* (Prov. 9. 1.) See *the seven Stairs which the King of Heaven hath placed in the entry of his inner house! Ezek.* 40. 22. The six first degrees are of visible creatures, the seventh of invisible Angels: After the same manner, as there were nine dayes wherein God wrought, and rested the seventh; six Planets in heaven of inferiour light, the seventh of extraordinary brightnesse, the Sun; six baser metals on earth. The seventh exceeding all in perfection, gold, &c. And as *Salomons* Throne had six inferiour steps to every of which there were six inferiour

Leonc'es

Leoncels adjoyned: after all in the seventh place stood the Throne, and by it two *Lions* (1 *King.* 10. 19,20.) So the King of eternity, when he built him a visible throne of glory, erected six visible degrees of corporeous creatures, to every of which he added their *Leoncels*, that is, their virtues, and their powers, and last of all, about the throne on high, he placed the strongest of the creatures, *the Angels mighty in power*, (*Psal.*103. 19,20.)

But now what mean the seven planets in heaven? what mean the seven continents on earth? the seven kinds of meteors, seven kinds of metalls, seven kinds of stones, &c? the seven combinations of tangible qualities? the seven differences of taste? the seven vitall members in man? the seven tones in musick? and other things which we meet with throughout all nature? yea, and in the Scripture the number of seven is every where very much celebrated, and sacred: For what do the seven dayes of the week point at? what are the seven weeks betwixt the Passeover and Pentecost? what the seventh year of rest? what the seven times seventh of *Jubilee*? what do all these portend I say, but that it is, the expresse image of that *God, whose seven eyes passe*

through the whole earth? (Zach. 4. 10.) *and whose seven spirits are before his Throne,* (Apoc. 1. 4.) yea, who doth himselfe make a *mysticall eighth* with every degree of his creatures. *For in him all things live, and move, and have their being*; which live and move, and have a being (*Acts* 17. 28.) *and he worketh all in all,* (1 *Cor.* 12. 6.) *and all these are as it were him himselfe,* (*Eccles.* 43. 27.) and yet none of them is he himselfe, (*Job* 12. 9. 10.) but because all these have some effigies of the divine essence, and operate that which they operate by virtue thereof; hence it is, that he being above all, without all, and beneath all, is the true mysticall eighth of all. *Of whom* (that *Syracides* may conclude our meditation, though we say much, we shall *not yet attain thereto. The sum of the doctrine is,* that he is all. *For what ability have we to praise him? For he is greater then all his works. The Lord is terrible and very great, & marvellous is his power. Extol the Lord in praise as much as you can: For yet he wil be greater then all praise,* (Eccl. 43. 30. &c.) Therefore *let every spirit praise the Lord, Hallelujah.* (Psal. 150.) *And thou my soul praise the Lord* (Psal. 103. 1.) *Holy, holy, holy, Lord of Hosts! Heaven and earth are full of his glory,* (Isai. 6. 3) *Hallelujah.*

A Short

APPENDIX TO PHYSICKS.

Touching the Diſeaſes of the Body, Mind, and Soul, and their generall Remedies.

I.

Diſeaſe is the corruption of an Entity in ſome part thereof, and a diſpoſition of it to totall periſhing (that is death.)

Therefore both the Body, Mind, and Soul, hath its diſeaſes.

II The diſeaſes of the body are various, ſcarce to be numbred; and oft-times mixt.

A diſeaſe added to a diſeaſe is called a *ſymptome* of a diſeaſe.

III A disease of the body is either by solution of that which is continued, or by distemper of humours.

IV Solution of that which is continued, is either by a rupture, or a wound. A rupture is prevented by bewaring falls, and violent motion. A wound is avoided by shunning of those things, which can cleave, cut, prick, rent, tear or bruise, or hurt anyway: and both are to be cured by the Chirurgion.

N. W. The cure of a Wound, is desperate, if any vitall member be hurt: as *the heart, the brain, the liver, the entrals,* &c. For then the vitall actions are hindred, and soon after cease. 2 If any member be quite lost, it cannot be set on again: because the spirit hath not wherewithall to passe into the part that is severed.

V The distempers of the humours and the diseases that come from thence, always proceed from some of these 6 causes: namely, *either from*

1 *Crudity*
2 *Inflation*
3 *Distillation*
4 *Obstruction*
5 *Putrefaction*
6 *Inflammation*

VI Cru-

VI Crudity in the body is nutriment not sufficiently concocted: namely either Chyle, or blood, which comes 1 *from the quality* of meat and drink; when they are taken too raw, flegmatick, unwholesome, which the concoctive faculty cannot well subdue. 2 *from the quantity:* when more meat and drink is put in, then it is able to alter and assimilate unto the body. For hence undigested and not assimilated humours, burthen the body, like strangers, and not pertaining thereunto. 3 *For want of exercise:* when the naturall heat is not stirred up, nor strengthened to perform its office lustily in the concoction of meats.

From such like crudities diverse inconveniences follow. For 1 if the crudity be in the stomack, it causes *loathing of food:* for so long as the first food is not digested, there can be no appetite to any other. Again, *children have an appetite* to eat earth, chalk, coales, &c. according as the crudities are turned into the likenesse of any matter. For like desireth like. 2 If there be a viscous crudity adhering in the ventricle or in the guts, being warmed it takes spirit, and is turned into *wormes*; which gnawing the bowels stir up evill vapours by

their motion: whence also come *phantasies*, very hurtfull to the head. Lastly, crudity under the skin, (in the bloud and flesh) begets *paleneſſe*: and when it is collected and putrified; *ſcabs*, *ulcers*, &c.

Crudity is prevented by a temperate diet, as to Food, Sleep, and daily exerciſes: and *cured* 1 by violent expurgation. 2 by ſtrong exerciſes. 3 by the uſe of tart meats and drinks. 4 by comforting the ſtomack with ſuch things, as heat, both within and without.

VII Inflation is much and groſſe vapour, exhaling from the crudities that are gathered together, and *ſtretching the members*. And that either without pain as when it cauſeth *yexing* or *belching* in the ventricle; *panting* in the heart; *giddineſſe* in the head (when being prohibited to go any further it is carried in a round) *lazineſſe* and *ſtretching* in the whole body; or elſe with pain, as when it cauſeth *aches* in the bowels (ſtraightning the ſpirits that lie between in the Fibres) and *ſharp* or elſe *blunt prickings* in the muſcles, according as it is more groſſe or ſubtile.

It is cured 1 by ſtrong exerciſe, that the vapour being attenuated, may go out at the pores

pores opened. 2 by expurgation of the humours by which they are generated.

VIII *Distillation is the condensation of crude vapours into rheume, which is the cause of many evils.*

For crude vapours gettting up to the head, when as by reason of the abundance and grosseneſſe of them, they cannot be expurgated by the ordinary paſſage, they become rheume flowing ſeverall wayes, and cauſing diverſe diſeaſes. For 1 If they run abundantly, and run at the noſe, they cauſe the *Murre* or *Poſe*, 2 If the diſtillation fall into the jawes, it cauſes the *Catarrhe*. 3 If into the kernels of the jawes, the *Quinſie*. 4 If into the lungs *difficulty of breathing*, and the *Aſthma*. 5 If the diſtillation be ſalt and ſharp, ulcerating the lungs, it cauſes the *Cough*. 6 Which if it be done oft, and the lungs be filled with apoſtemes, it cauſes the conſumption. For when the ulcerous lungs cannot with dexterity enough perform their office of cooling the heart, the vitall ſpirit is generated more hot then it ſhould be, which doth not cheriſh, but feed upon the fleſh and bloud, and at length burns out the very workhouſe it ſelf of the bloud, which is, the liver: whence

for want of bloud, which is as it were the food, followes the consumption of the whole body. 7 If the distillation flow in abundance, and grosse down the marrow of the back, it causeth the *Palsie*, (by hindring the animall spirit, that it cannot be distributed by the nerves springing from the back bone.) 8 If it fill the nerves of the muscles onely, it becomes the *Spasma*, or *Convulsions* (that is when the nerve is contracted, like as a chord being wet and dried again, is wont to be contracted, and become shorter.) 9 If it flow subtle, and penetrating the nerves, it is at length gathered together in the extremities of the members, and there raises sharp pains; which in the feet are called the *Gout*; in the hands, *Chiragra*, or the *Hand-gout*; in any of the joynts of the bones *Erthritica*, the running gout; in the hip, it is called *Ischias*, or the *Hip-gout*, commonly the *Sciatica*. 10 Lastly, if those kind of runnings stay in the head, they procure divers diseases: as when they are subtle, the *Head-ach*. 11 Too raw and flegmatick, the *Lethargie*. 12 Salt, and cholerick, the *Phrensie*. 13 Grosse and mixt with a melancholy humour, the *Epilepsie*, or Falling-sickness, (when as the spirits diffused through the

the whole body, making haſte to relieve the ſpirits beſieged in the brain, make moſt vehement ſtirs, and fight, till they either overcome and repell the diſeaſe, or elſe faint and are extinguiſhed. 14 But if the groſſe phlegmatick humours have occupied all the veſſels of the brain at once, it becomes the apoplexie, that is, a privation of all ſenſe and motion: whence alſo the vitall fire in the heart is ſoon after extinguiſhed.

☞ *All theſe diſeaſes are both prevented, and alſo* (if they go not too farre) *cured* 1 by exerciſe. 2 by rectification of the brain by good ſmels. 3 by a thin, hot, and ſulphury air. 4 by thin, light meat and drink. But the peculiar cure of every diſeaſe is commit- to the phyſicians.

IX *Obſtruction is a ſtopping of the bowels by thickned flegme, whence it comes to paſſe that they cannot execute their office.* For example, when the entrals are ſtopt, that they cannot void, it is the *Volvuli*, or *wringing of the guts:* when the liver is ſtopt, the *dropſie*; (For the *Chylus* being not turned into bloud, flowes through the veins and members, and is not turned into members.) When the bladder of gall is ſtopt, *the Yellow Jaundiſe*; when the Spleen, *the Black Jaundiſe*; (For in

in the firſt the choler, in the other the melancholy, when it cannot be voided, diffuſeth it ſelfe through the bloud. But when the urine pipes, or the veins, or the bladder are ſtopped, that is by reaſon of the breeding of *Tartar*, which they call the *Stone:* which ſtopping the paſſages, by its ſharpneſſe pains the *Veins and Nerves.*

The cure is 1 by purgations. 2 by medicines attenuating, or breaking, cutting, and driving out the groſſe humours which Phyſicians know.

X *Putrefaction is the corruption of ſome humour in the body: namely, either of flegme, or of choler, or of melancholy; which putrifying either in or out of their veſſels, produce feavers or ulcers.*

The cure is 1 Expurgation of the place affected. 2 A good diet. 3 Motion.

XI *Inflamation is a burning of the vitall ſpirit* (N. vitall) *or of the bloud cauſed by too much motion* (either of the body by wearying it, or of the mind, by muſing and anger,) *or elſe by putrefaction, or elſe by obſtruction.*

For it is known out of the phyſicks, that motion doth heat even unto firing, and that by obſtruction doth by an *Antiperiſtaſis* exaſperate

asperate the heat included (even in those things that are watry and putrid) so that at length it breaks out violently, hay laid up wet, (when it cannot get transpiration) doth shew. When the bloud is kindled within, it becomes a *feaver*: when under the skin, *S. Anthonies fire.*

The generall cure is the opening of a vein, and cooling. But of feavers (being that it is a most common disease, and of divers kinds) something more is to be said.

XII *The feaver so called, from its fervency or heat, is of three kinds.* 1 The Ephemera. 2 The Putrid. 3 The Hectick. *The first burns the spirits; the second the humours; the third the solid parts.* The first like a raging hot wind scorching all it meets with: the second like boiling water poured into a vessell, which it heats with it selfe. The third like unto a hot vessell, heating the water poured into it with it selfe.

For the *Hectick* occupies the bones and membranes, and eats and consumes them with an unnaturall heat, by degrees almost insensibly, till at length it causeth death. It is very like the Consumption. But the putrid or rotten feaver occupies the bloud and humours; by which the whole body grows

grows hot. The Ephemera is a more subtle flame, feeding upon the spirits only: and therefore it scarce endures one or two days, til the peccant cause be consumed by the spirit it self. Hence either health or death usualy follows within two or three dayes; and therefore it is called the Ephemera or diary Feaver: also the *Maligne* feaver. Of which sort also is the pestilentiall infection: for it comes after the same manner.

Putrid feavers are most usuall, but with very much difference: for when the humours putrifie within their vessels, (or workhouses) especially near the heart, (in the liver or the gall,) the spirit rises against them, and kindles them: and ceases not to assault them, till it either expell the rottennesse being turned into soot, or be extinguished it selfe; and therefore this feaver is often deadly, it is called the *Continuall Feaver*.

But if the humours rot out of their vessels, that is, in the veins or members, it is an *Intermitting Feaver*. For the spirit riseth up at certain times, and opposeth that rottennesse with heat: but because this battle is made further off from its Castle, the heart, when the fight is ended, it returns

turns home. And *if the putrifying humour be flegme*, it still returns to oppose it the next day: hence the Quotidian Feaver. *If it be yellow, choler*; then every third day. Hence the *Tertian*. *If black choler*, the fourth day. Hence the *Quartan*: the cause of the inequality, is because the flegme recollects it selfe soonest, and makes new businesse for the spirits: but is withall sooner dissipated: Hence the Quotidian lasts not long. Melancholy being that it is a dreggy humour, doth not so soon recruit it selfe: but because it is soft and viscous, it is not so easily overcome: hence the long continuance of Quartans, In the Tertian, because the spirit opposeth yellow choler, which is hot of it selfe, is made the hottest fight: hence Tertians are called burning feavers. They are sometimes changed one into another, or one joyned with another, according as one while one putrified humour, another while another is to be opposed.

Hence it appears 1 *Why a feaver begins with cold?* because the vitall spirit being to oppose the rottennesse, gathers heat as it were its aid from every part, the outward members in the mean time being benummed, and

and quaking with cold. (For even in too much fear, when the ſpirit gathers it ſelfe into the inward parts, there is wont to follow a chilneſſe of the outward members, and a quaking with cold.) 2 *Whence afterwards heat?* becauſe the ſpirits, after they are hotter with fight and motion, return again to the members; which, being cold before, do ſo much the worſe endure the heat, returning now hotter then ordinary. 3 *Why the feaver leaves faintneſſe behind it?* becauſe the ſpirit wearied with fight, betakes it ſelfe to reſt, leaving the members deſtitute. 4 *Why food is hurtfull at the beginning of a feaver?* becauſe when the ſpirit is preparing it ſelfe for the battell, it hath another buſineſſe put upon it, (to concoct the food:) But ſeeing that it is not able to do both, it either aſſaults the diſeaſe more weakly, or elſe leaves the food unconcocted: or at leaſt, if it do both, it weakens and tires out it ſelfe too much. 5 *Why it is dangerous to expell the feaver over ſoon?* becauſe the feaver is of it ſelfe a benefit to nature, driving away the rottenneſſe in time, leſt it ſhould at length prevaile and oppreſſe the heart. Therefore that is no good cure of feavers which ſtayes the fits, but that which ri-

ripens the rottenneſſe for expulſion. And ſtrengthens nature to oppoſe them, which I leave to Phyſicians.

Let this be the ſum of that which hath been ſaid, Crudity is the ſeed of all diſeaſes. For thence groſs vapours ariſing, cauſe *Inflation*, the ſame condenſed in the head, cauſe, *Diſtillation*: in the other members, Obſtruction: whence flowes either *Rottenneſſe* or *Inflamation*. *Therefore let him that prevents crudities, believe this; that he takes the beſt courſe that may be for his whole body. Now the way to prevent them is a temperate diet and daily exerciſes. O the ſtrange virtue of labour, whereby we get both our bread and health! which miſtery if the ſlothfull underſtood, they would not waſte their lives with idleneſſe.*

Of the Diſeaſes of the Mind.

I The Diſeaſes of the mind are vices, procuring either diſquiet, or griefe thereto.

II Diſeaſes diſquieting the mind, are evill deſires; that is, too much ardency. 1 Of Living. 2 Of Eating and Drinking. 3 Of Multiplying it ſelfe. 4 Of Knowing. 5 Of Having. 6 Of Excelling.

N. W. Theſe are thus expreſſed by their proper names, 1 *Selfe-love.* 2 *Intemperancy.* 3 *Salacity.* 4 *Curioſity.* 5 *Covetouſneſſe.* 6 *Ambition.* For they that are given to theſe, itch and are diſquieted continually.

III The diſeaſes that cauſe griefe to the mind, are immoderat affections; that is violent alterati-

ons for those things which befall us according to our desires, or contrary thereto: but especially Sadnesse, Angor, and at Irksomnesse of life.

IV The remedies of the mind are held forth in the Ethicks. The Sum whereof comes to this. *Love the Golden Mean, shun extreams like unto precipices. Never desire to do more then thou canst: Remember that thou art a man.* For that may befall every one that befalls any one. *There is a vicissitude of all things, an unconquered mind overcomes all things, &c.*

Of the Diseases of the Soule.

I The Diseases of the Soule are, Forgetfulnesse of God, Torment of Conscience, and Despair of Mercy.

II Forgetfulnesse of God is cured by the Fear of God. Of, I say, that God, who seeth all, judgeth all, rewardeth all, to every one according to his works: to avoid whose hand, it is impossible. (For in him, we move, live, and have our being,) but to endure it is intolerable. (For he is a consuming fire, &c.)

III Torment of conscience is healed by prayers, and and Study of innocency, Psal.26.6. Eccl.12.13,14. For if our heart condemn us not, we have full assurance, &c. *1 John 3.21.*

IV Despair is healed by the bloud of that onely Lamb of God, which purgeth us from all sin, 1 Joh. 1.7. and reconciles us to his Father, *Rom.3.25.* and saves us, *Rom.5.9.* and gives us eternall life, *Joh.6.54*

In body sound, a mind as sound, O God we pray thee give,
That here in peace, in after blisse; for ever we may live.

FINIS.

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